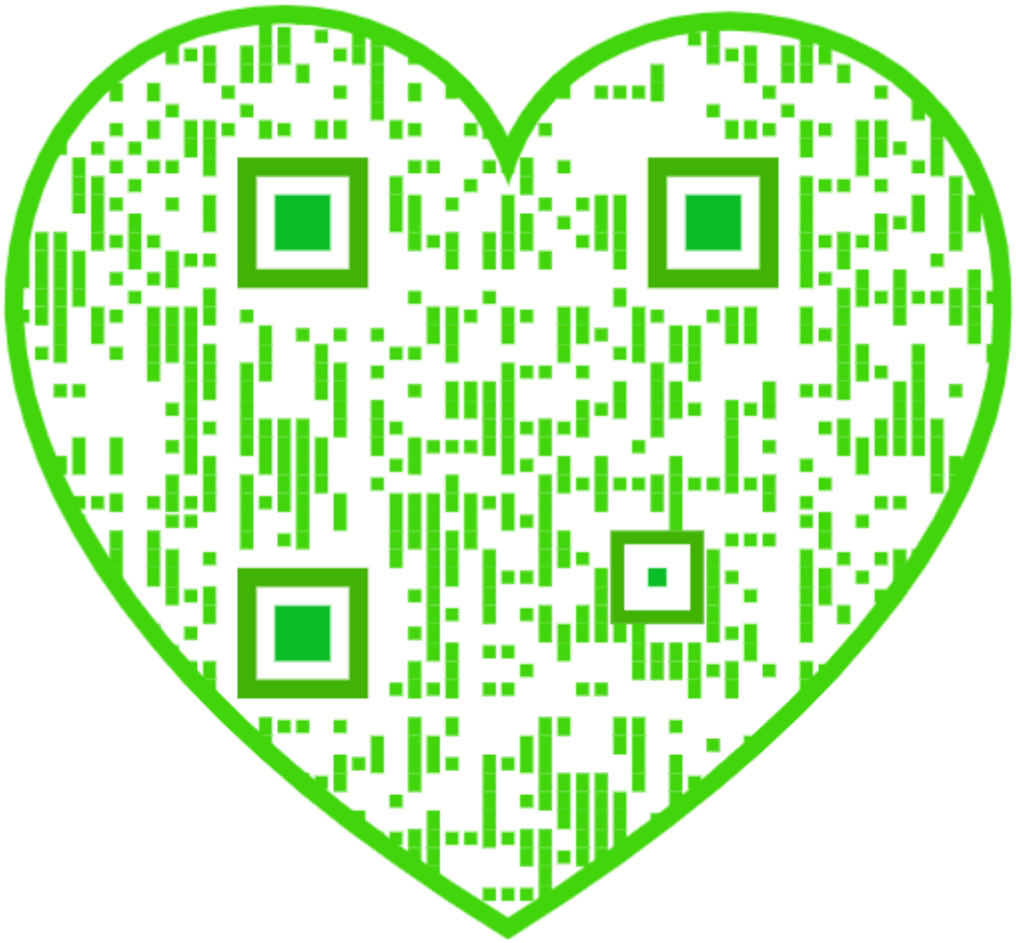

A COMPLETE GEOGRAPHY

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TARR AND McMURRY GEOGRAPHIES

A COMPLETE GEOGRAPHY

BY

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WITH NUMEROUS MAPS AND MANY ILLUSTRATIONS, CHIEFLY PHOTOGRAPHS OF ACTUAL SCENES

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PREFACE

In the plan of this volume the authors have left the beaten track to such an extent that some words of explanation seem in place.

General Geography. — Probably the most difficult part of the geography for Grammar School grades is that dealing with seasons, winds, rainfall, temperature, etc. It ordinarily occupies a considerble number of pages at the beginning of the larger book, and follows immediately upon Primary Geography.

This arrangement requires pupils to spring from a meagre study of simple, concrete facts to the highest abstractions in the entire subject; and what makes the matter worse, these broad abstractions are usually only very briefly stated.

The authors of this volume have followed a different plan. Only three chapters, at the beginning of the book, precede the intensive treatment of the United States. The first is a physiographic history of the continent, showing how its principal mountain ranges and valleys came into existence; how its coal beds were formed; what were the effects of the great Ice Age; and what have been the more recent changes in the coast line, with their results. Then comes a chapter on the Plants, Animals, and Peoples of North America; and following that is a treatment of Latitude and Longitude.

Only so much is presented before taking up the United States, because that is all that seems really necessary. Whatever further facts have been needed for North America in regard to seasonal changes, winds, etc., have been plainly stated, when wanted, just as other concrete facts have been. After our continent is finished and a fair number of concrete data, bearing on these matters, has been collected, these topics themselves are treated in much detail. By this arrangement, the study of these difficult subjects has been

postponed one year, and they are then approached somewhat inductively. The authors regard this as one of the most important among their proposed changes in method.

The general principles in regard to industries, distribution of inhabitants, mutual relation of city and country, and dependence of various sections upon one another form another subject which, contrary to custom, is treated in the middle and latter parts of the volume. One reason for this is that these broad truths approach abstractions in their nature, and are, consequently, too difficult to be earlier appreciated by children. They are, moreover, to a large extent, a summary of what has preceded, and, therefore, naturally come last. A more inductive approach is, therefore, again highly desirable. Their great importance, also, has caused more than the usual amount of space to be given to them.

Physiographic Basis and Causal Sequence. — The authors believe that rational geography must rest upon a physiographic foundation. It is physiographic conditions which most often furnish the reasons for the location of human industries, the development of tranportation routes, the situation of cities, etc. In other words, when the physiographic facts about a given region are clearly grasped, most of the other geographic facts easily arrange themselves as links in a causal chain. Thus the many details touching a certain locality are taught in relation with one another, so that they approach the form of a narrative, rather than that of a mere list of statements.

Physiography has, therefore, been introduced freely; but not too freely, provided each physical fact is shown really to function in man's relation to the earth. Physiography that is clearly shown to have a *real* bearing upon man greatly enriches the subject of geography; it is the *unused* physical geography in the grades that is a stumbling block, and this we have tried to avoid.

Review of North America. — A common defect in the teaching of geography is that the facts previously learned about the United States fade from the pupil's memory while other countries are being studied. Yet the relation between North America and the other continents is so marked that this defect is unnecessary. For example, most of the industries and important principles of physiography and

climate have received the attention of a child when he has completed a general study of the United states. Foreign lands illustrate the same great ideas under slightly different conditions. This means that the comprehension of foreign countries may best be gained by our children if they use their previous knowledge of the United States as a basis of comparison. If, then, this old related knowledge is carefully called to mind when the physiography, climate, and industries of a foreign land are approached, our pupils will not only secure a fuller appreciation of that region, but will also keep fresh their knowledge of the United States by bringing it into use.

The above has been a controlling idea in preparing this volume. Accordingly in approaching the physiography of South America (p. 305), the physiography and climate of Europe (pp. 337–344), grazing in Argentina (p. 318), etc., we have reproduced the corresponding situation in our own country at some length. Besides this, we have included in the text scores of brief comparisons with the United States. By this means incidental reviews are continually provided, which are especially attractive to both teachers and pupils because they contain more of motive than the ordinary "review for review's sake."

To supplement this kind of review several sets of questions, which call for still different comparisons with the United States, are included in the book, one series being found at the close of the treatment of each continent. These are likewise rich in motive, inasmuch as they recall leading facts in regard to the United States from varying points of view. It should be kept in mind also that each set at the same time reviews another continent from a new point of view.

Many of the facts in regard to the United States which these questions call for are not presented in the text which treat of the various continents, and answers for a few of them are not indicated in the maps. Also pupils may have forgotten some of the important information about the United States. For these reasons Section XXIV, covering thirty-two pages, in an organized review of North America alone. It includes the principal facts about our continent which every pupil should know on completing the grades.

The title of the last section, "The United States Compared with Other Countries," indicates provision for still further review. It has seemed to the authors an anti-climax to close several years' study of geography with the *Islands of the Pacific*, lands farthest away from us and of least interest to us. On the other hand, it has been deemed highly important that, after all the countries of the world have been treated, the closing chapter should summarize the situation and show the rank of our own land and its relation to others. This secures a final reconsideration of the principal facts in our geography, while at the same time it brings them into proper relation and perspective.

On the whole, we are of the opinion that reviews should occupy a large part of the time of instruction; and by the plan followed we hope that pupils will have a fairly complete knowledge of the United States and the rest of the world in their possession, not only when they finish the grades, but in years to follow.

Types. — Another characteristic of this volume is that it deals with many of the fundamental ideas of geography at some length. As was suggested in the Preface of the Primary Book, the basal units for the study of geography, although constantly in use, are seldom adequately presented in the text-books. This applies strikingly, for example, to such topics as farm, cattle ranch, irrigation, lumber camp, and factory. In order to remedy this defect as far as possible, each subject of such a kind is presented in these books with as much detail as space permits, and in connection with that section of country in which it seems most prominent.

For example, lumbering, fishing, and the manufacture of cloth, boots, and shoes receive their most detailed treatment in connection with New England; the mining of coal and iron ore and the manufacture of iron goods are discussed in connection with the Middle Atlantic States; and gold mining, irrigation, and grazing are naturally included under the Western States.

The industries and objects thus described, being fairly typical of industries and objects found elsewhere, are on that account worthy of being called *types*. Through the careful presentation of such types, vivid pictures and an appreciation on the part of the pupils are assured.

The study of the United States has, as suggested above, furnished occasion for detailed treatment of most geographic types. Some important features and occupations, however, are not found in the United States, and to these we have endeavored to give the same careful consideration. For instance, so far as space permits, the Brazilian forest is presented as a type of tropical forests (page 314). Other illustrations may be found in the treatment of the linen industry on page 359; and the silk industry on page 385. The object is to continue to acquaint the learner properly with the basal units of geography.

Relative Worth of Facts. — Good judgment is nothing more than proper appreciation of the relative worth of knowledge. Certainly geography should be utilized for the development of this quality. The study of any subject by types tends in this direction because types themselves are the topics of special value. The frequent comparisons provided for at the close of many of the chapters accomplish the same purpose, for they lift the more important thoughts into prominence while neglecting non-essentials. Similarly the two review chapters, one a Review and Comparison of our states, the other a Comparison of the United States with other countries, distinguish in a marked way the leading from the minor facts. But, above all, throughout this volume the subject matter in each chapter is presented under few headings, so that the learner is likely to be impressed with the simplicity of the situation. The authors, at least, cherish the hope that the pupil will see the outline clearly even in the midst of the necessary mass of details. Certainly it is one duty of a text to teach a child to separate major from minor points and to carry the outline in mind.

The need of more attention to this matter of perspective is most clearly shown in the study of the United States by individual states. To be sure, there is a call for a knowledge of our own country by states, and an endeavor has been made to meet it by several sets of questions which require a careful state review. But when the geography of the United States is presented *primarily* by states, the child is oppressed and confused by the great number of individual facts which have apparently the same rank. Even an adult cannot easily

escape a feeling of confusion on reading a few pages from any modern geography that divides the subject into such small units. The remedy, therefore, is to proceed by much larger divisions, *i.e.* by groups of states.

Thus farming by irrigation is only one topic, and only once treated, for the entire western division of states. Several pages are devoted to a discussion of the subject, including the manner in which irrigation is planned, its influence on the value of land, the localities most noted for irrigation, and the cities in the different states that are largely indebted to it for their growth. These many details are associated as parts of one story. By this means the children's minds may be led to dwell long enough upon one topic to insure interest in it; and as there are only a few such topics in the entire chapter on the Western States, each indicated, too, by special type, it is not difficult to keep in mind the leading points.

Similar provision for relative values in the study of foreign countries is clearly illustrated in the chapter on the British Isles.

Political Maps. — Since it is necessary to represent more places and present more details, the political maps in this volume are for the most part larger than in the Primary Book; but they are of the same quality. An important feature is the grading of cities according to population — the larger the city, the more important the type used. The principal features of relief are placed upon the map, though without interfering with the clearness of the political divisions. In the color arrangement care has been used to gain an artistic effect, and at the same time to preserve the distinctness necessary in such maps.

No attempt has been made to preserve the same scale for the different maps. Some books claim to do this, and their authors point to the fact as noteworthy. The authors of this series have deliberately declined to make such an attempt for several reasons. In the first place, it is impossible. There must be maps of the World, of North America, of the United States, of a part of the great West, and of New England. Even in those books which point to their uniformity of scale as a merit, maps of five or ten different scales are in use.

The claim for uniformity of scale has no real foundation; but, if it had, the effect would be undesirable. One of the objects of the study of geography is to teach the meaning and use of maps. To do this, one of the first and most fundamental points is to teach the pupil to understand the meaning and importance of the system of proportion, or of "scale." In one book are maps of various scales; in the first atlas, or in the first wall map which the pupil sees, there are still different scales. The pupils must be prepared to expect and to understand these differences, and it is the teacher's duty to see that they are so prepared. By the insertion of Pennsylvania as a key, and by some of our map questions we have attempted to aid in this training of the sense of proportion.

Other Illustrations. — Besides the relief indicated on the political maps there are individual relief maps made especially for this series. The relief maps of the continents are pronounced by experts to be the best thus far made.

The city maps are intended to serve to illustrate the surroundings which determine the growth of the large cities, including, of course, the transportation facilities by water and by rail. Attention is also called to the maps showing the distribution of the important industries and to the diagrams that accompany them. These are all placed in the summaries with which they are most closely related; but the teacher will naturally find occasion to use them and refer to them in connection with the study of the earlier sections. A series of maps is also introduced which gives a graphic view of the density of population of the continents. All the railway lines of each of the continents excepting Europe are also shown either on the political maps or else by special maps. The colonies of some of the leading nations are given in two full-page illustrations; and the great commercial routes of the world are represented by a single page map. It is believed that this large number of maps, each devoted to a specific object, will be found of great value.

Besides the maps and diagrams there are many half-tones of photographs selected to supplement the text. They are not introduced merely as pictures, but as part of the fund of information

offered. For this purpose the half-tone is the best adapted; there is reason for confidence in the accuracy of such views.

Acknowledgments. — The political and many of the black maps are made by the Matthews-Northrup Company, of Buffalo; the relief maps by E. E. Howell, of Washington. The world maps showing the distribution of products are in part based upon maps kindly furnished to us by the Philadelphia Commercial Museum, and a few of them are actual reproductions of the museum maps. Our photographs have been selected from various sources, but the larger number have been purchased from William H. Rau, of Philadelphia. Through the kindness of Commander Webster we have obtained permission to use the photographs reproduced in Figures 472, 501, 502, and 503; and Figures 325, 330, 331, 332, 337, 348, 349, 468, 515, 535, 537, 541, 545, and 550 are borrowed from Ratzel's "History of Mankind." A number of European views were loaned by Dr. Heinrich Ries, of Cornell University, and the wash drawings were made by Mr. C. W. Furlong, also of Cornell.

We are indebted to Mr. Philip Emerson, of the Cobbet School, Lynn, Massachusetts, for his suggestive criticism of the manuscript and for further aid in the preparation of the section on Australia. Valuable assistance in the preparation of the statistical tables and index has been rendered by Mr. R. H. Whitbeck, of Cornell University. While we have drawn upon many sources for the information upon which the text in this volume is based, the extensive use that has been made of Mill's "International Geography" and the "Statesman's Yearbook" — books which every geography teacher should have at hand — calls for special acknowledgment.

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NORTH AMERICA

I. PHYSIOGRAPHY OF NORTH AMERICA

The Growth of the Continent. — There are about one hundred million persons in North America at the present time, although a century ago there were scarcely one-tenth of that number. This wonderful growth has been largely due to the useful and valuable mineral products of the earth; to the soil and climate which have allowed many different kinds of plants and animals to thrive; and to the rivers, waterfalls, lakes, and harbors which have made manufacturing and shipping easy.

As it takes time to build a house, and to prepare the boards from trees, the nails from iron ore, and the bricks from clay, so it takes time for the formation of minerals and rocks and for the building of a continent. In fact, millions of years have been required for that work.

The story telling how North America was made is a very interesting one. It has been discovered by a careful study of the rocks; and although there are many questions that no man is yet able to answer, we are prepared to tell a part of the story.

At one time the earth was probably a white-hot sphere like the sun; but in time the outside cooled to a crust of solid rock. The interior, still heated, continued to shrink and grow smaller, as most substances do when cooling. This caused the solid crust to settle and wrinkle, much as the skin of an apple does when the fruit is drying. Water collected in the depressions forming the oceans, while between them, where the elevation of the earth's crust was greatest, rocks appeared above the sea level. Thus North America and the other continents were born.

In its babyhood, although the centre of the continent was still a broad sea, the eastern and western parts doubtless resembled the West Indies of to-day, which you will find on the map of North America (Fig. 44, opposite p. 45). Those islands are the highest parts of a mountain chain. They *seem* to be separated only because the ridges upon which they rest do not rise high enough to reach above the water (Fig. 1).

Fig. 1.

A small picture of the West Indian region as it would appear if the ocean water were removed. Notice that the islands rest on a lofty ridge rising from the ocean bottom.

Although in early times North America consisted of mountain crests forming chains of islands, finally, after many changes, the mountains rose higher, forming a continuous range in the East, and other ranges in the West. Then the plains between the mountains slowly emerged from the ocean, and a large part of the continent came into view.

The Coal Period. — Ages after the beginning, a period arrived when in the northern part of North America it was much warmer than now, and the rains were far heavier. During that period our *coal* was made out of plants. There is good proof that the coal used in our stoves and furnaces is composed of plant remains. Beneath the coal beds, in the rock which was once soil, roots of plants may still be seen, while stems of plants, and even trunks of trees changed to coal, reach up into the coal beds. Also a careful examination with the microscope, or at times even with the naked eye, shows that coal is composed of bits of plants closely pressed together. Frequently the full form of a fern or leaf may be seen (Fig. 2).

Fig. 2.

Rock containing a fossil fern which grew in the swamps of the coal period.

As the crust of the earth shrinks and wrinkles, the land is raised and lowered. Even now it is slowly moving in some places, and was doing the same during the coal period. At that time some of the old sea-bottom was raised above the water, forming extensive plains in the eastern part of North America. Plants had long been growing; and these plains were so low and level that vast swamps were produced (Fig. 3), on which the vegetation was extremely rank, like a tropical jungle. After the swamp plants had grown for hundreds of years, the plains sank beneath the sea, and the vegetation became covered with layers of sand, gravel, and mud, which have since hardened into rock.

Fig. 3.

The way the coal swamps appeared, so far as we can tell from the fossils which have been preserved.

After another long period the sea-bottom emerged once more, and the dense swamp vegetation returned; but this time the plants grew with their roots in the ocean mud which had buried the earlier swamp. After many more years the plains again sank, and the swamp vegetation was buried as before. This rising and sinking of the land continued for ages, one set of layers of rock, soil, and vegetation being covered up by another, until many such sets were formed.

Though the swamps were, no doubt, somewhat similar to those which may now be seen in many places, the vegetation grew far more thickly, perhaps even more thickly than in the jungles of India or the everglades of Florida. Also the plants were so different from those of the present (Fig. 4), that not a single species now living grew in the coal swamps.

When the plants died, they fell into the water, making a woody matting which did not fully decay, because the water prevented air from reaching it. If it had been dug up and dried, it might have made good fuel. Indeed, it is now the custom in Ireland, Norway, and some other cool,

moist lands to dig such matter out of the swamps and dry it, forming *peat*, a fuel used for cooking and heating.

Some of the poorer coals of the West, known as *lignite*, are little more than peat beds partly changed to mineral coal. Other coal, called *anthracite*, found especially in the mountains of Pennsylvania, has been changed so greatly that it is as hard as some rocks, and is known as *hard* coal. But most of the coal that is mined, — as that of western Pennsylvania and the Central States, — although quite like a mineral, and harder than lignite, is not so hard as anthracite. This is called *soft* or *bituminous* coal.

The woody matting that gathered in some of the swamps grew to be scores of feet in thickness; but, on being covered up, it was pressed more tightly together. As the number of layers above increased, causing the pressure to become very great, it gradually changed into coal, making coal beds that are often from six to twelve feet in thickness.

Fig. 4.

A view in the Dismal Swamp of Virginia. Compare Fig. 3 with this to see how different the trees are.

All this time, and at other periods during the formation of the continent, iron, copper, gold, silver, building stones, and other materials that we need every day, were also being slowly formed in the rocks; but we cannot now tell their story.

The Mountains and Plateaus. — During the millions of years that the continent was growing to its present form, there were rising, in the East and West, mountain systems and surrounding plateaus that were to have a great influence upon our climate, and therefore upon our crops, our animals, and ourselves. Being very old and much worn down, the eastern mountains, called the *Appalachians* (Fig. 10), are neither very high nor very rugged, though they have some peaks which reach more than a mile above sea level. The western *Cordilleras*, being younger and therefore less worn, are more rugged, and

have peaks rising three miles and more above sea level. At the base of the Appalachians is a narrow plateau rarely more than fourteen hundred feet high; but the Cordilleras tower above a broad plateau which is itself more than a mile in height, or as high as the mountain peaks of the East.

Many of the rocks of the mountains and plateaus were deposited as sediment in the sea and afterward raised to their present position by the movements of the earth's crust. In spite of their great elevation, the plateaus have remained level because the rock layers, or *strata*, of which they are made, were kept in a horizontal or level position while being uplifted. This can be seen where rivers have cut deep channels in the earth, showing the layers of rock to be nearly as level as when they were a part of the ocean floor (Fig. 7).

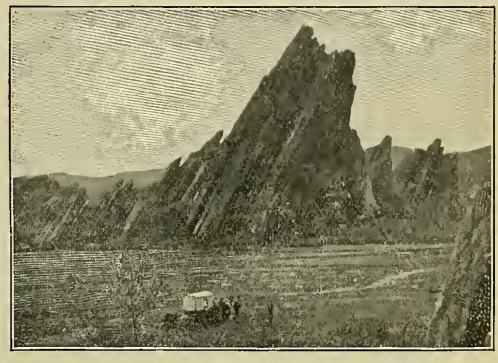


FIG. 5.

Tilted layers in the Rocky Mountains of Colorado. They were deposited as horizontal beds in the sea, as those of the Colorado plateau were (Fig. 7); but, during the mountain folding, they have been turned up on end, and then worn away and carved into irregular hills by the rains.

On the other hand, the wrinkling of the earth's crust has in some places broken and folded the rock layers, and formed lofty mountain ranges in which the strata have been tilted and upturned, instead of remaining level (Fig. 5).

A part of the height of mountains is due to the fact that they rest upon a platform of tablelands about them. Therefore a mountain crest two miles above sea level *may* really rise less than a mile above the plateau at its base.

Mountains are not nearly so high as they would be if they had not been attacked for ages by the weather and the rivers. Not only have they been *lowered* by these means, but also greatly carved and sculptured, being cut into ridges and peaks, and crossed by deep canyons which the rivers have dug out.

After mountains have ceased rising, their peaks are lowered, and their

valleys broadened, until they lose much of their mountain character, as in the case of the Appalachians. Indeed, they may even be reduced to a series of low hills, as in southern New England, which is really an ancient mountain region now worn down to its very roots.

The folding, breaking, and sculpturing of the mountain rocks have had an important effect upon mining. As you see from Figure 9, these changes often bring to view valuable minerals which were formed ages ago and are now deeply buried in the strata.

As we have seen, some mineral deposits, like coal, were laid down in beds between other layers of rock; but many valuable minerals, such as gold, silver, and copper ores, were deposited in cracks of the mountain rock, forming *veins*. Into these cracks hot water, often heated by deeply buried masses of lava, has brought valuable metals and deposited them in veins. Iron ore also has been deposited by water in beds and veins, though not always by hot water.

Volcanoes. — Hundreds of mountain peaks in the West, instead of being made in the manner just described, are *volcanoes*. These are built of molten rock that has been forced to the surface from within the earth. Though no longer active, these peaks are *known* to be volcanoes because of their cone shape, the hollows or *craters* in their tops, and the lava and volcanic ash, or blown-up lava, of which they are made.

Doubtless some of these volcanoes have recently erupted; indeed, one, Mt. St. Helens in Washington, is reported to have been in eruption about a half century ago. Another, near Mt. Shasta in California (Fig. 6), poured forth lava a very short time ago. This is known because the lava flow dammed up a stream, forming a lake whose waters rose into the surrounding forest, and killed the trees; but the trees still stand in the lake, not having had time to decay.

Hundreds of thousands of square miles of this western country are covered by lava flows. The soil produced by decay of the lava is often extremely fertile, and that is one of the chief reasons why the central and eastern part of the state of Washington, which is largely covered with it, has become noted for its fruit and wheat. There the lava flowed out from great cracks or *fissures* and flooded immense areas of country. The area of the lava flows in the Columbia and Snake river valleys is more than twenty-five times as great as that of Massachusetts.

The Trough between the Two Mountain Systems. — From the mountain systems of the East and West, the land slopes gently

toward the Mississippi River (Fig. 10), which flows in the trough made by the uplift of the two sides of the continent. Measure the width of this trough on the map of the United States (Fig. 46, p. 45).

This extensive lowland has had a long history, like the mountains. In the early ages so much of it was under water that a great sea extended from where the Gulf of Mexico now lies to the Arctic Ocean. In the rock layers are found many remains, or *fossils*, of shells, corals, and fish that lived in the sea of this ancient time. Upon dying and dropping to the bottom, these animals were entombed in the beds which have since been hardened to rock.

Fig. 6.

Mt. Shasta, California, one of the great volcanic cones of the West, 14,380 feet high, and made entirely of lava and volcanic ash. A smaller cone is seen on the right.

After a time most of this sea bottom was raised to form dry land, although a part of it — from the Gulf of Mexico to southern Illinois — remained under water for a long time afterward. Into this sea the Mississippi discharged its floods and dropped its load of soil, swept from the distant fields and mountains. As time went on, the river filled up the sea and formed flood plains, which — raised by a slight uplift — are among the most fertile lands of our country. And now the river seems bent on filling up the Gulf itself.

Although the mountains and plateaus of our country are so far away from the lowlands, they have a great influence upon them. The Mississippi Valley, in all but its southern part, is in a belt of

the earth where most of the winds blow from the west. Since these winds blow from the Pacific Ocean, they are at first damp; but upon reaching the western highlands, they are compelled to drop much of their moisture, and then they pass on into the Mississippi Valley as dry winds. This causes the plains and plateaus of the northwest to be dry or *arid*. The eastern and southern portions of the valley have a more humid climate. The reasons for this are that this region is so near the Gulf and the Atlantic, and is separated from the latter by such low mountains, that damp ocean winds are able to reach it.

In spite of the fact that most of the West is arid, many rivers have their sources among the high mountains. Notice, for instance, how many tributaries of the Mississippi rise among the mountain ranges (map, Fig. 46, opposite p. 45). This water carries sediment for hundreds of miles, building it into flood plains and deltas. From this it is evident that the highlands not only supply the Mississippi with much of its water, but also with some of the soil which has made such fertile farm land.

The *direction* in which the ranges extend is a matter of great importance, also. Since the mountains run north and south, the warm south winds find no highlands to check their northward course. Therefore, they are able to carry warmth and moisture a great distance, even far into the northern part of the United States. In consequence, the Mississippi Valley is one of the largest and finest farming sections in the world, producing a great variety of crops. Where the summers are shortest, though still warm, excellent wheat is raised; farther south, corn is the principal crop; and in the southern part, where the summers are longest and hottest, tobacco, cotton, sugar-cane, and rice are grown.

How different it would be if a great mountain system extended east and west across the continent! The warm summer winds could not, then, carry their warmth and moisture so far north; neither could the north winds, which are cool in summer and cold in winter, reach so far south. The north winds are very important; they moderate the heat of summer and bring cool weather in winter. Sometimes they do damage in winter by causing destructive frosts, even as far south as Florida. Then the orange and lemon trees suffer greatly. But they also do good, for too much heat takes away the vigor of the people, while cool air makes them more active.

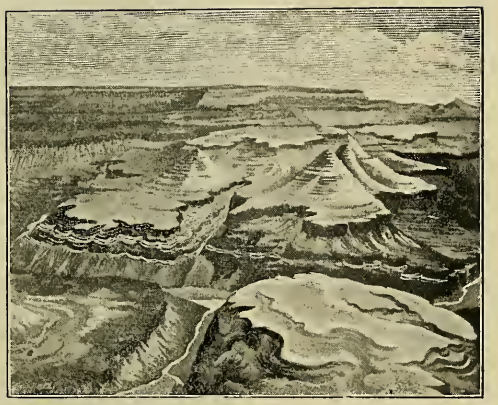
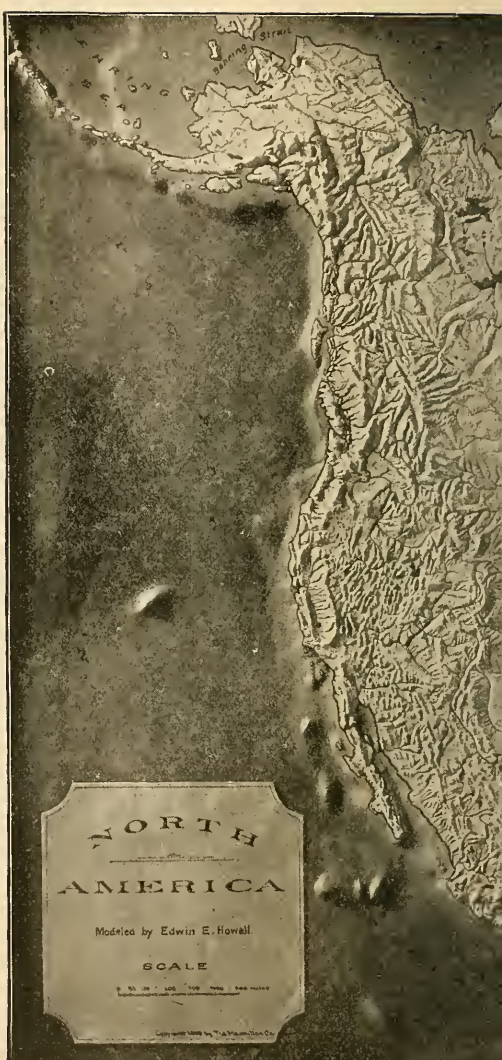


Fig. 7.

This valley, known as the Colorado Canyon, has been cut to a depth of over a mile in the rock strata of the Colorado plateau. Can you see the horizontal strata?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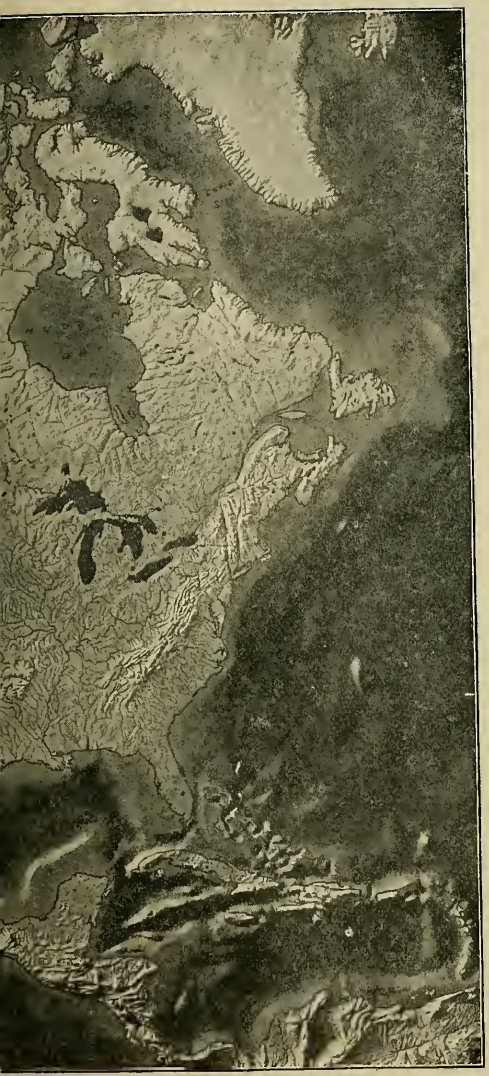

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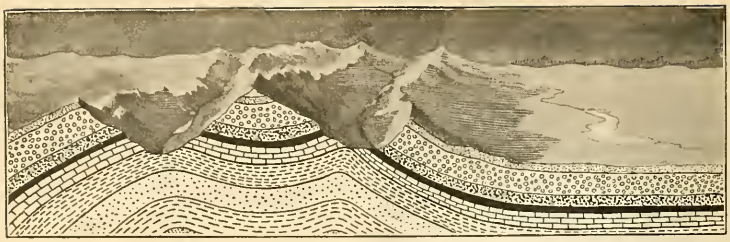


FIG. 9.

A section in the earth, where the rocks are folded, to show how a bed of valuable mineral, such as the black layer, may be brought to light by folding and river cutting, while elsewhere it is deeply buried.

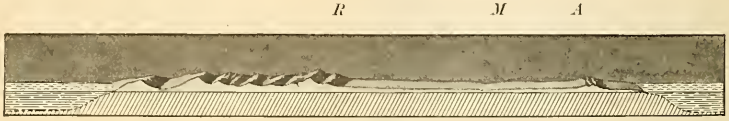


FIG. 10.

Section across the United States, to show the two highlands and the great trough between. *A*, Appalachians; *M*, Mississippi; *R*, Rocky Mountains.

FIG. 11.

Model showing the distance which the Great Ice Sheet reached in United States. (Model made by E. E. Howell, Washington, D.C.)

The Great Ice Age. — Long after the coal beds were formed, and the great highlands and valleys were built, another very important event happened in the preparation of this continent for our home. That was the formation of a great *ice sheet* or *glacier*, which covered a large part of northern North America. This glacier had much to do with making the lakes, waterfalls, and even the soil itself, in that section.

An ice sheet similar to that one may still be seen in Greenland (Figs. 12 and 13). Excepting along the very coast, this immense island is buried beneath a sheet of ice which has an area about ten times as great as that of New York State.

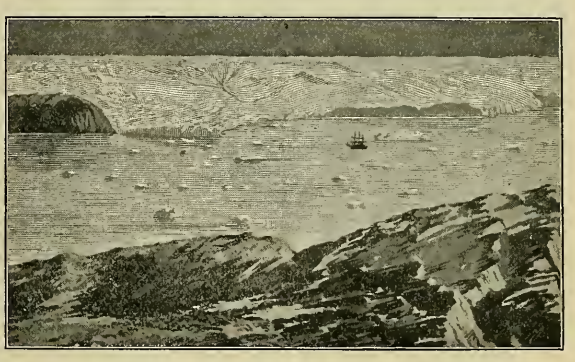


Fig. 12.

A picture of the Cornell glacier in Greenland. It is a great waste of ice, slowly moving down from the interior to the coast and ending in the sea, where icebergs break off and float away. Some of these may be seen in the picture.

The Greenland glacier is made of snow which has fallen on the high interior in such immense quantities that the pressure upon the under part has changed it to ice, as pressure from your hands will change a snowball to ice. As the snow collects and becomes ice, it spreads out, or *flows*, from the interior toward the coast, much as a piece of wax may be made to flow if a weight is placed upon it. Moving toward the sea, the glacier drags away the soil, tears off fragments of the rock, and scours the rock layers, as if it were a great sand paper. The movement is very slow, yet the ice is always pushing onward to the sea, where enormous *icebergs* are continually breaking off and floating away (Fig. 12).

The glacier which formerly extended over a part of our continent was likewise made of snow. It covered most of northeastern America, reaching as far south as New York City and the Ohio River, but not so far south in the northwest (Fig. 11). Being over

a mile deep in its thickest part, and in consequence very heavy, the glacier swept away the soil which had previously been made. Not only this, but, by the help of rock fragments held fast in its bottom, it scraped off pieces of the solid rock and carried them forward also.

FIG. 13.

The ice front of a part of Cornell glacier (Fig. 12), with moraine at its base, where rock fragments fall from the melting glacier. The dark lower part of the glacier is filled with pieces of rock.

Although the glacier was always pushing southward into our country, its southern end was continually melting away, owing to the warmer climate which it met. At times the movement was just rapid enough to supply the waste due to this melting, so that the edge remained in nearly the same position for years. All this time the sand, gravel, and rock, which had been carried along in the ice, were being piled up along the line where the

FIG. 14.

Some hummocks in a moraine formed by the Great Glacier near Ithaca, N.Y.

glacier melted, forming a great mass called a *moraine* (Figs. 13 and 14). The moraine hills, or hummocks, of gravel and clay were often built to a height of one or two hundred feet.

After standing for a while and building a moraine in one place, the glacier front often advanced to the south, or melted away toward the north, building up other irregular piles of moraine hummocks.

During the thousands of years that the glacier lasted, it carried millions of tons of clay and rock from one place to another and built

many low hills. As it slipped over the surface, it ground boulders and pebbles together and rubbed them against the solid rock, scratching and grooving it (Fig. 15). Scratches thus made may still be seen pointing northward, toward the place from which the glacier moved. This work of rasping, digging, carrying, and dumping done by the glacier has led to its being compared to a combined file, plough, and dump cart of immense size.

Finally, after thousands of years, the great ice sheet melted away. No one is able to say why it came or why it went away; but that it *was here* and did the work described, all who have studied the subject are fully convinced.

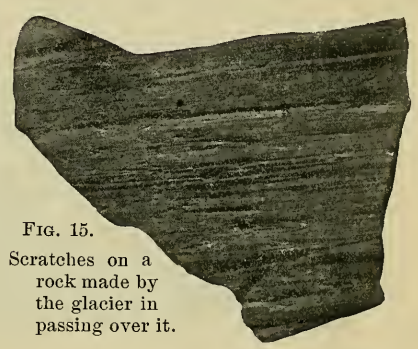


FIG. 15. Scratches on a rock made by the glacier in passing over it.

It was this glacier which caused the great number of lakes in the northeastern part of North America. Minnesota alone is said to have ten thousand, and in New England there are also thousands (Fig. 16 and Fig. 64, p.64); but most of the states outside of the glacial region have extremely few.

The manner in which these lakes were formed is as follows: The load of clay and boulders, or *drift*, as it is called, was dumped irregularly over the land. It sometimes partly filled valleys and built up dams, behind which ponds and lakes collected. The glacier also formed lake basins by digging, or ploughing, directly into the rock. Even the Great Lakes did not exist before the glacier came; their basins occupy broad river valleys which have been blocked by dams of drift and deepened by the ploughing of the Great Ice Sheet.

The glacier also had an important influence upon our manufacturing. Its load of rock fragments often filled parts of valleys so that, after the ice was gone, the streams were compelled to seek new courses. These courses often lay down steep slopes or across buried ledges, over which the water tumbled in a succession of rapids and falls. Even the great cataract of Niagara was caused in this way, and the same is true of many of the falls and rapids of hilly New

England and New York. The many lakes act as storehouses to keep the noisy falls and rapids well supplied with water. For these reasons New England and New York have such abundant water-power that they early grew to be the greatest manufacturing centres of the Union. In sections of the country not reached by the glacier, rapids and falls are much less common. Did the glacier reach where you live?

A third important influence of the glacier was upon the soil. In most other parts of the country the soil has been made by the *decay* of rock (see First Book, p. 2); but in the glacial region the decayed

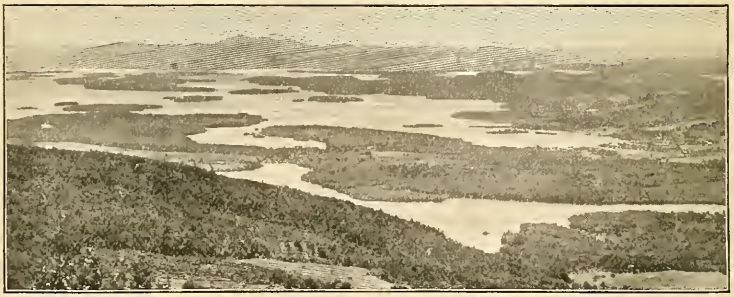


FIG. 16.

A New England lake formed by a dam of drift left by the glacier. It is very irregular because the water behind the dam has risen into many valleys, leaving only the hilltops above the surface.

rock was swept away and replaced by drift brought by the glacier. This was made by the grinding of rocks together, much as flour is made by grinding wheat; in fact, glacial soil is sometimes called *rock flour*. As the glacier scraped along, it ground an enormous quantity of rock to bits, so that when it melted, a layer of drift was left, in some places reaching a depth of several hundred feet. Most of the clays from which bricks are made in the North were also brought by the ice sheet.

With the melting of the glacier, much water was produced. This washed out and carried off a great deal of clay, in some places leaving extensive sand and gravel plains, where the soil is not very fertile.

The bits of ground-up rock left by the glacier have an important effect

upon the soil. Since these fragments were gathered up from many places, and from many different kinds of rock, they sometimes cause a fertile soil in places where the decay of the rocks would have naturally caused a sterile soil. The constant rusting, or decaying, of these rock fragments supplies the soil with plant food; and for this reason the glacial soils are usually fertile year after year. But, on the other hand, in some places the glacier failed to grind the rock into tiny bits, leaving pebbles and even large boulders to cover the ground and prove a great nuisance to the farmer (Fig. 17).

FIG. 17.
A field on Cape Ann, Mass., where the glacier left many large boulders.

The Coast Line. — In studying about the Mississippi Valley and the formation of coal, we have seen that the land and sea bottom are not fixed, but that they often slowly rise or sink.

Such changes in the land level are even now in progress in many places, though so slowly that it requires years, and even centuries, to notice them. For instance, along the coast of New Jersey the land is sinking at the rate of about two feet a century, while the land around Hudson Bay is rising.

Some of the recent changes in the level of the land have had an important effect upon the coast line. For example, the reason we find so many islands and peninsulas along the northeastern coast (Fig. 44) is that this section has been lowered several hundred feet. By this means the ocean water has been allowed to enter the valleys, while the higher land between them extends above the water in the form of peninsulas, capes, and islands.

The peninsulas of Labrador and Nova Scotia, and the hundreds of islands along the northeastern coast, including Newfoundland, owe their existence to this sinking. The irregular Pacific coast from Puget Sound northward (Fig. 18) was produced in the same way.

By this sinking of the land many good harbors were made, the best ones being where rivers enter the sea. When the land was higher, the streams carved out broad valleys, into which, when the

land sank, the sea water entered, forming bays and harbors. That is the way the Gulf of St. Lawrence was formed; also New York,

FIG. 18.

A picture of the irregular coast of southern Alaska, near Sitka, where the sinking of the land has drowned the valleys, leaving only the hilltops projecting above the sea.

Delaware, Chesapeake, and San Francisco bays, as well as the many excellent harbors of the East. What rivers carved out the bays mentioned? (See maps, Figs. 44, 46, and 67.)

One reason for so few good harbors along the coast of the Southern States is that the land in this section has been *rising* out of the sea. Just off the coast is a broad ocean-bottom plain where the water is shallow (Figs. 45, 68, and 96), while still farther out, the bottom slopes rapidly and the ocean becomes very deep. Upon this sea-bottom plain, called the *continental shelf*, layers of rock bits, or *sediment*, are being deposited, much as layers of rock were formed on the sea bottom during the coal period. If the continental shelf should be raised, it would form a great level plain.

FIG. 19.

A part of the raised sea bottom which forms the level plain of Florida.

That part of the Southern States which borders the Gulf of Mexico and the ocean was once a portion of this ocean-bottom plain; but it has been raised until it is now a low, level plain (Fig. 19). Since the continental shelf is so level, when a part of it was lifted

above the water there were few places for deep inlets, bays, and harbors. After being raised, the coast was slightly lowered; but the bays thus formed are shallow and the harbors poor.

The level plain of the Florida peninsula is also a sea bottom that has been lifted above the ocean. Many of the lakes and swamps which abound in that region are believed to be due to the shallow basins built by the irregular deposit of sediment on the old sea floor.

Size, Shape, and Position. — North America is third in size among the six continents of the earth. By reference to the tables in the Appendix, find which are larger and which smaller.

After being changed in shape during millions of years, owing to the rising and sinking of the land, it at present has the form of a triangle with the broadest portion in the north. Draw the triangle. Compare its shape with that of South America and Africa (Fig. 585). The northern part is so wide that Alaska extends to within fifty miles of Asia; but Labrador is over two thousand miles away from Europe. The distance from Alaska to Asia is so short that the early ancestors of our Indians and Eskimos probably first reached North America by crossing over from Asia. On account of the greater distance across the Atlantic, Europeans for a long time did not know that North America existed; but it is certain that the Norsemen from Norway visited our shores nearly five hundred years before Columbus discovered the continent.

Those portions of North America which are nearest to Asia and Europe are so cold that few people live there. Farther south, where most of the inhabitants live, the continents are spread farther apart, as you will see by examining a globe. The broad Atlantic must be crossed in passing from Europe to America; this fact helps to explain why the Spanish colonies were able to win their independence from Spain, and the United States from England. The distance across the sea was too great to send large armies and supplies for them.

This separation of Europe from America has also helped in the development of our industries. At first, the colonists brought even bricks, doors, and timber from Europe; but although the ocean is an excellent highway, it is expensive to send goods such long dis-

tances. Therefore the settlers soon learned to raise and make most of the articles that they needed for food, clothing, and shelter.

Nevertheless, the ocean is such an excellent highway that ships are able to sail across it in every direction and bring what we really need, or carry back such products as cotton and tobacco, which Europeans desire. Ships have also brought to us the hundreds of thousands of English, Irish, Germans, French, Swedes, and others who have settled and developed our country, and whose descendants are its citizens. Since Europe is our *mother land*, it has been, and is still, very important to keep in close touch with its various nations. This has been made possible partly by the shortness of the journey, now that vessels are moved by steam, and partly by the excellent harbors caused by the sinking of our coast.

The Pacific Ocean is much wider than the Atlantic (see a globe), and therefore much more difficult to cross. Although the shores of Asia which face North America are densely settled, until recently we have not needed to have much commerce with the inhabitants of that continent because they were not very progressive. Now, however, the Japanese have adopted the methods of modern civilization, and we have come into control of the Philippine Islands, so that many of our ships cross the Pacific.

South America is also easily reached by water, and there is much trade with the various countries of that continent. Although South America is joined to North America by the narrow Isthmus of Panama, there is at present no railway connecting the two continents, though one is being planned. This isthmus is a great barrier to ocean commerce between eastern and western United States and between the Eastern States and Asia. It is very narrow, and in places only two or three hundred feet high; yet, because it is there, ships must travel thousands of miles around South America. A railway crosses it, and ship canals, one across the isthmus, and another farther north, are being constructed. Of what advantage will these be?

Summary. — So we see that our continent, as we know it, has not been here from the beginning; instead of that, millions of years have been required to prepare it for us. Ocean bottoms have been lifted into mountains, plateaus, and valleys; coal beds, building stones, and valuable minerals have been formed; a mighty glacier has swept over the country, grinding rock into powder and causing lakes, water-routes, falls, and rapids; and the coast

has been sinking here and rising there, producing fine harbors in some places and greatly increasing the extent of the plains in others. Our very position, separated by the ocean from the Old World, and yet enabling us to reach it when it is necessary, is an advantage.

REVIEW QUESTIONS. — (1) What was the condition of North America in early times? (2) What is coal made from? Tell how it was formed. (3) What proofs are there of this formation? (4) What is peat? (5) Name and locate our two chief mountain systems. (6) How high are the plateaus at the base of each? (7) Explain why the plateaus are so level in spite of their height. (8) How have the mountains been made? (9) Explain what effect this has had upon mining. (10) Tell about the volcanoes of the West. (11) Why is the Mississippi Valley called a trough? (12) What was its condition in early times? (13) How was the interior sea finally changed to dry land? (14) Mention some ways in which the mountains control the Mississippi Valley. (15) What differences would follow if the mountain ranges extended east and west? (16) Describe the Greenland glacier. (17) How far did the great American ice sheet reach? How deep was it? (18) What are moraines? (19) What do the scratches on the rocks tell us about the glacier? (20) Why is a glacier compared to a plough? A file? A dump cart? (21) In what ways did the glacier cause lakes? (22) Falls and rapids? (23) Soil? (24) What effect has the glacial soil upon farming? (25) Tell the whole story of the glacier. (26) Why are there so many islands, peninsulas, bays, and harbors in the northeast? (27) Name some of them. (28) How have some of our largest bays been made? Name them. (29) Why are there so few harbors on our southern coast? (30) What is the cause of the southern plains? (31) What is the continental shelf? (32) How does North America compare in size with the other continents? (33) How far is the mainland from Asia and Europe? (34) Show how our position is a favorable one. (35) What is the influence of the Isthmus of Panama? (36) In what zones is North America?

SUGGESTIONS. — (1) Make a collection of different kinds of coal. (2) Examine some pieces of soft coal closely to see if you can discover plant remains. (3) Obtain some peat. (4) Learn what you can about coal mining. (5) Examine layers of rock in your neighborhood to see if they are horizontal or tilted. See if they contain fossils. (6) Make a drawing similar to Figure 10. (7) Make a model of a volcano out of sand or clay. (8) What becomes of the Greenland icebergs? (9) Make a map showing the extent of the American glacier. (10) What signs of the glacier, if any, can you find in your neighborhood? (11) Name several great cities that have grown up about our Northern harbors. Name some in the South. (12) Draw an outline map of the northeastern coast, and another of the southern coast, to see how they differ. (13) How many days long is the voyage, on a fast steamer, from New York to Liverpool? How many miles an hour does the steamer go? How many miles does that make the distance? (14) How long is the journey from San Francisco to Manila? (15) From New York to Manila by going eastward? Through what waters would one pass on such a voyage?

FOR REFERENCES TO BOOKS AND ARTICLES, see the *Teacher's Book* of this series.

II. PLANTS, ANIMALS, AND PEOPLES

The climate of a region is one of the most important facts concerning it ; for where temperature and rainfall are favorable, plants usually grow luxuriantly. And since plants furnish animals with food, where vegetation is luxuriant, animal life may be abundant.

Since North America extends far north and south, and possesses lofty mountain ranges and enclosed plateaus, it has a great variety of climate, and, therefore, a great variety of plant and animal life.

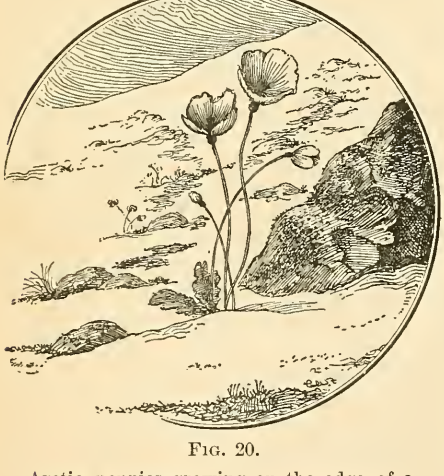


Fig. 20.

Arctic poppies growing on the edge of a snowbank.

Plants of the North. — The northern part of the continent is bitterly cold. In that region there is a vast area where the soil is always frozen, excepting at the very surface, which thaws out for a few weeks in summer. On account of the frost, trees such as we are familiar with cannot grow. Their roots are unable to penetrate the frozen subsoil and to find the necessary plant food. There are some willows, birches, and a few other plants with woody tissue, bark, leaves, and fruit ; but instead of towering scores of feet into the air, they creep along the surface like vines, and rise but an inch or two above ground. Only by thus hugging the earth can they escape the fierce blasts of winter and find protection beneath the snow.

A few grasses and small flowering plants grow rapidly, produce flowers, even close by the edge of snowbanks (Fig. 20) and then

pass away, all within the few short weeks of summer. Some of these plants produce berries, which after ripening are preserved by the snows ; thus, when the birds arrive in the spring, they find food ready for them.

Animals of the North. — The summer development of insects is rapid, like the growth of plants. As the snow melts and the surface thaws, the ground becomes wet and swampy, and countless millions of insects appear. Among them the most common is, apparently, the mosquito. There are few parts of the world where this creature is a worse pest than on the *barrens* of North America and the *tundras* of Europe and Asia, as these treeless, frozen lands are called.

Fig. 21.
Walrus on the Arctic floe ice.

Few large land animals are able to thrive in so cold a climate and where there is such an absence of plant food. The reindeer, or caribou, the musk-ox, polar bear, white fox, and Arctic hare are the largest four-footed land animals (Fig. 22) ; and the crow, sparrow, and ptarmigan are the most common land birds.

The ptarmigan changes its plumage to white in winter, and other animals of the Arctic, such as the fox, polar bear, baby seal, and hare, are also white. This serves to conceal them, in that land of snow and ice, so that they may hide from their enemies, or steal upon their prey unawares.

The tiny white fox feeds upon birds and other animal food ; but the other land animals, except the polar bear, live upon plants, such as berries, grass, and moss. The caribou finds a kind of plant, called "reindeer moss," which grows upon rocks that rise above the deep winter snows. If it were not for this, the reindeer would not be able to live through the long winter.

While some animals live upon the land in the Arctic regions, many more have their homes in the sea, because there, excepting at the very surface, the temperature never descends below the freezing point. Therefore, there is plenty of animal life of all sizes, from the very tiniest forms to the whale, the largest animal in the world (Fig. 179, p. 179). During the winter the surface of the sea freezes over; and then many of the sea animals migrate southward. Even the huge walrus (Fig. 21) moves clumsily toward a more favorable climate. The birds go farthest, especially the geese, ducks, and gulls, which fly to Labrador, New England, North Carolina, and even farther south, to spend the winter where their food is not covered by ice.

Sea birds exist by hundreds of thousands (Fig. 22), building their nests upon rocky cliffs in immense numbers. Indeed, they are so numerous that, when suddenly frightened, as by the firing of a gun, they rise in a dense cloud that obscures the sun. Then, by their cries they produce a din that is almost deafening. In the water live seals (Figs. 201 and 317) and walruses, the former being so valuable for their oil and skins that men go on long voyages to obtain them. The oil comes from a layer of fat, or "blubber," just beneath the skin, that serves to keep out the cold.

The seal is the most common of the Arctic sea animals, and is the principal food of the Eskimo and the polar bear (Fig. 317). The bear, protected from observation by his white color, stealthily creeps upon his prey, asleep upon the ice; or, he patiently watches until his victim swims within reach, and then seizes him in his powerful claws.

Plants and Animals in Western North America. — A large area in western United States and Mexico has a very slight rainfall, although its temperature is agreeable. This arid area includes most of the territory having less than twenty inches of rain (Fig. 304, p. 270). In some places, as near the Pacific coast and upon the mountain tops and high plateaus, there is rain enough for forests to thrive; but in most parts of the Far West the climate is so dry that there are no trees whatsoever. Indeed, some portions of the West are desolate in the extreme and almost devoid of life, both plant and animal; in other words, they are true deserts.

One common plant is the bunch grass, so called because it grows

FIG. 22.

Some of the animals of the North. The great auk had such small wings that it could not fly. It was killed in great numbers by sailors, and has been completely exterminated.

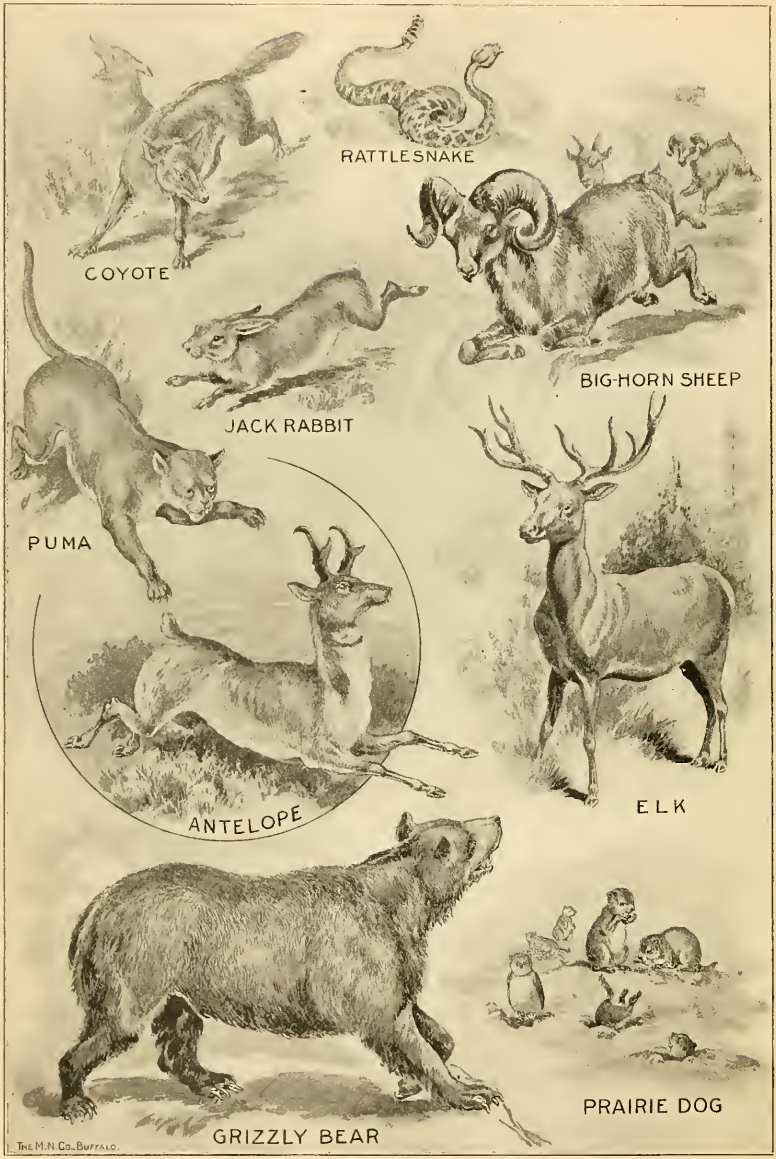


FIG. 23.

Some of the animals of the plateaus and mountains of the Far West.

in little tufts or bunches. The sage bush, a plant with a pale green leaf, named because of its sagelike odor, is found throughout most of this arid region. Other common plants are the mesquite, the century plant with its sharp-pointed leaves (Fig. 225, p. 213), and the cactus with its numerous thorns. In favorable spots, especially in the warm southwest, the mesquite grows to large size; and the cactus, which in the north is always low and represented by only a few kinds, in the southwest, as in Arizona, grows in great variety and, in some cases, even to the height of trees (Fig. 24).

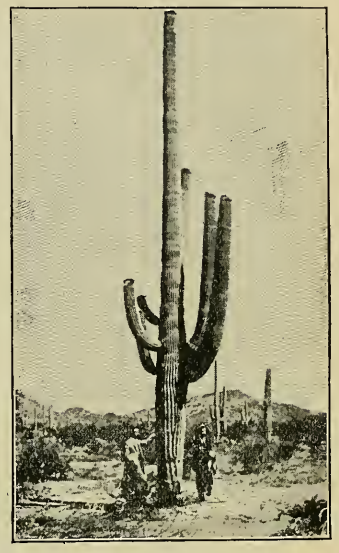


FIG. 24.

Giant cactus in the desert of southwestern Arizona.

On account of the extreme dryness of the climate, these plants have a severe struggle for existence, and adopt peculiar means for protecting themselves. For example, the cactus, unlike other plants, has no leaves. It thus exposes little surface to the air for evaporation. In its great, fleshy stem it stores water to use through the long, dry seasons, while spines protect it from animals in search of food. The mesquite also protects itself by spines, and in addition has such large roots that the part of the plant under ground is greater than that above. The roots of this plant are an important source of wood for fuel. Some of these plants, as mesquite, are so bitter that they are not eaten by animals.

Animals eat few of the arid land plants except the grasses, which were once the food of the buffalo, or bison (Fig. 27), and are now the support of cattle and sheep (Figs. 127 and 213). The bison, whose home was on the prairies and the arid plains east of the Rocky Mountains, is now gone; and few large animals are left in its place. The cowardly prairie wolf, or *coyote*, and the graceful antelope and the rabbits upon which it feeds, are the most aboundant (Fig. 23). Among the rabbits is the long-legged jack

rabbit, which leaps across the plains with astonishing speed, with its huge ears thrown back so far that they do not retard its progress.

The traveller throghu the arid lands meets with few more interesting creatures than the prairie dogs which live in small communities, called prairie-dog towns (Fig. 23). Their homes are in the ground, and their food consists of grass. They do not venture far from their burrows for fear of the coyotes which may be lurking near; and upon the least alarm they utter a shrill note and tumble headlong into their burrows.

There are birds and some lower animals, as the poisonous tarantula, centipede, and scorpion, besides snakes, especially the poisonous rattlesnake (Fig. 23).

The fierce puma, or mountain lion, still lives among the mountains, and also the ugly cinnamon and grizzly bears (Fig. 23), though the latter are now rare and difficult to find. Deer and elk inhabit the forest-covered mountains of southern Canada and northwestern United States; and among the higher peaks a few mountain goats and sheep still live on the more inaccessible rocky crags (Fig. 23). The sheep have huge horns much prized by hunters.

Plants and Animals of the Tropical Zone. — Contrast the life in the frozen North and the arid West with that in Central America and southern Mexico. In these regions, which are situated in the torrid zone, the temperature is always warm; and the rainfall, especially on the eastern coast, is so heavy that all the conditions are favorable for dense vegetation.

Indeed, the tangle of growth in the forests is so great that it is practically impossible to pass through it without hewing one's way. Besides trees and underbrush, there are quantities of ferns, vines, and flowers, many of which hang from the trees with their roots in the air instead of in the ground (Fig. 323, p. 292). They are able to live this way on account of the damp air. Among the trees are the valuable rosewood, mahogany, ebony, and rubber tree; and among the flowers are the beautiful orchids. On account of the continual warmth and moisture, many plants, like the banana for instance, bear fruit throughout the year.

In the midst of such luxuriant vegetation, animal life is wonderfully varied and abundant. There are the tapir, monkey, and jaguar (Fig. 25), brilliantly colored birds, such as parrots, paroquets,

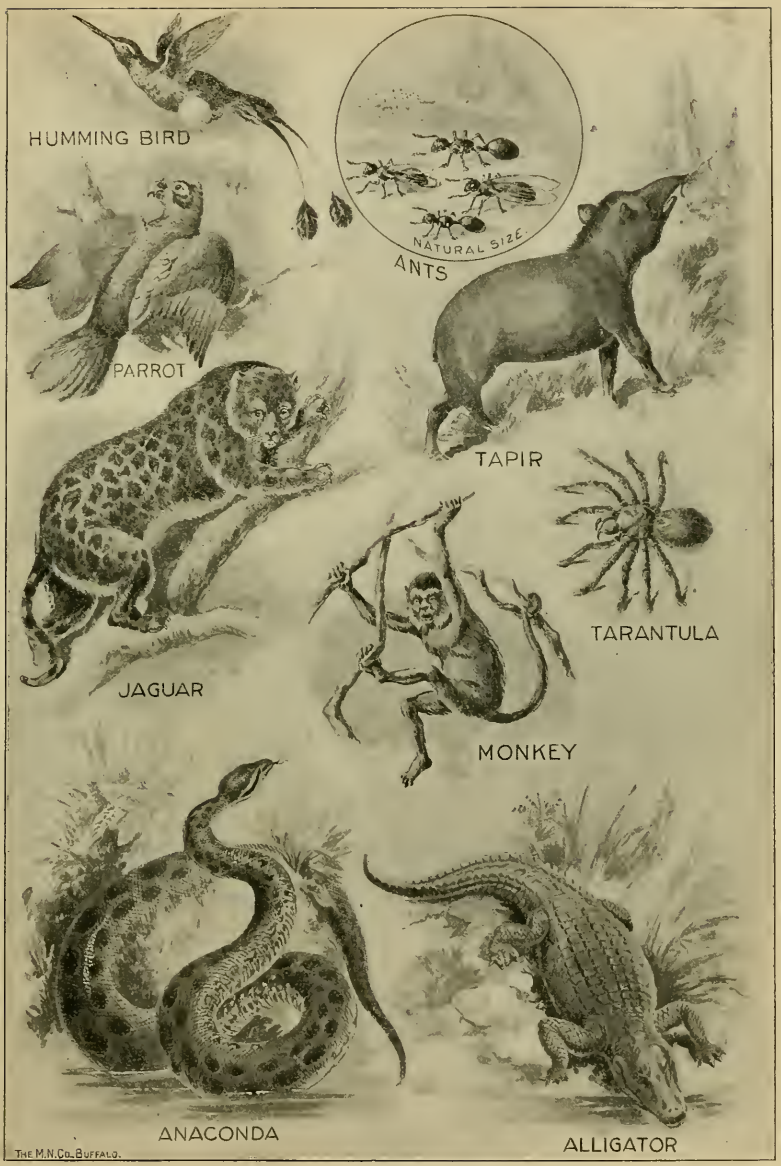


FIG. 25.

A few of the animals of the tropical forests.

FIG. 26.

Some of the animals of northeastern United States and southeastern Canada.

and humming birds; and millions of insects. Scorpions and centipedes abound, and ants exist in countless numbers, some in the ground, others in decayed vegetation. Serpents, some of them poisonous, are common in the forests; and in the rivers are fish and alligators, the latter being found as far north as Florida and Louisiana.

Plants and Animals in the Temperate Part of North America. — Between the frigid and torrid zones, and both east and west of the arid region, is an area of *moderate* rainfall and temperature where the vegetation and animals differ from those of the other sections. Beginning in the warm South and passing northward, we find that both animals and plants grow less numerous and less varied until, near the Arctic zone, they become scarce and few in kind. The pines and oaks of the United States give place to the spruce, balsam fir, and maple in Canada; then these gradually become stunted and disappear, and beyond this the barrens are reached (p. 20).

The animals that once inhabited the broad temperate zone have been mostly destroyed, although some still live in the forest and mountain region. They are carefully protected by state laws, which prohibit shooting except at certain seasons, and then only in small numbers. When America was first visited by Europeans, these woods abounded in deer, moose, caribou, wolves, and foxes (Fig. 26). Beavers built dams across the streams, the mink and otter fished in the waters, and bears roamed at will. Among the birds, the eagle was common (Fig 26), and wild pigeons and turkeys were so abundant that they were one of the principal foods of the early settlers.

Some believe that at one time most of the eastern United States was wooded, including the fertile prairies of the Mississippi Valley, from which the trees were burned by fires set by the Indians. Grass then sprang up in place of the trees, and the prairies became the grazing place for immense herds of bison (Fig. 27). The bison, however, like the other animals mentioned, have been mostly destroyed; thousands upon thousands were slaughtered for their hides and tongues alone, and their bones left to whiten upon the plains. There are now no wild bison in the United States, except a few which are protected by the government in the Yellowstone National Park. In this Park, where hunting is prohibited, are numbers

of deer and elk (Fig. 23). There are also black, cinnamon, and grizzly bears which are so tame that they come down to the hotels at night to feed upon the garbage.

A slow change has been in progress in this temperate section, which, when first discovered, was clothed in forests and luxuriant prairie grass, and inhabited by Indians and wild beasts. The white man has come into possession of the land and has cleared the forests and ploughed the prairies, so that, where trees stood and Indians

Fig. 27.

One of the immense herds of bison that formerly roamed over the treeless plains.

hunted the bison and other game, there are now fertile farms and thriving cities.

Our crops and domesticated animals well illustrate how man has learned to make use of nature for his needs. Every one of our cultivated plants was once a wild plant; and each of our domesticated animals has been tamed from the wild state. Most of these have come from Europe and Asia; but America has added some to the list. Among plants in common use, the Indian corn or maize, the tobacco, tomato, pumpkin, and potato, were unknown to the Old World until America was discovered. The same is true of the turkey; and perhaps, in a hundred years or so, the bison may be included among the domesticated animals, for on the cattle ranches of the West a few small herds are being carefully reared.

Peoples

Eskimos. — America was inhabited for thousands of years before it was discovered by white men. To the natives in the southern part Columbus gave the name *Indians*, supposing he had reached India. Those in the Far North, who subsist on meat, are called Eskimos, a word meaning flesh-eaters.

Fig. 28.

An Eskimo woman carrying her baby in the sealskin hood on her back.

To-day, in some places, the Eskimos live in very nearly the same condition as formerly, their climate being so severe that white men have not settled among them nor interfered with their customs. They still roam about in summer, living in skin tents, or *tupics*, and in the winter erecting snow and ice huts, or *igloos* (Fig. 29). Their struggle is a hard one, for they not only have to battle against cold, but also to obtain their food amid great difficulties. In this they are aided by their dogs, doubtless domesticated wolves, which, like their masters, are able to subsist upon a meat diet and withstand the severe Arctic cold. Every Eskimo man has his team of dogs to draw his sledge over the frozen sea.

Indians. — Indians were originally scattered over most of the country south of the Arctic Circle. This is indicated by the places that bear Indian names, as Narragansett, Erie, Niagara, Huron, Ottawa, Illinois, Dakota, Pueblo, and Sioux City. Some of the tribes were true *savages;* others, not so savage, may be classed as *barbarians*. They raised "Indian corn" and tobacco, baked pottery, used tools and weapons made of stone, and lived in villages.

In southwestern United States, Mexico, and Central America the aborigines were more civilized. Much of that region is arid; but the Indians raised crops by irrigation, and built fortresses of stone and sun-dried brick (Fig. 30). These were erected partly as homes for protection from surrounding savages, and partly as storehouses for grain.

The most noted among these Indians were the *Aztecs*, who occu-

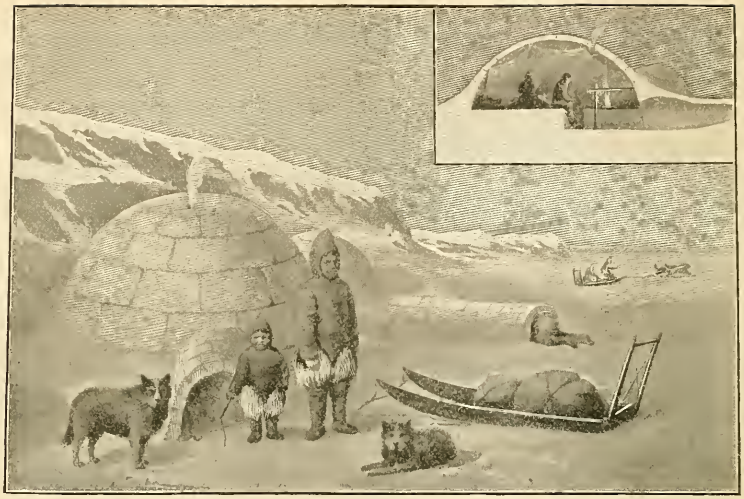


FIG. 29.

Eskimo igloos in Baffin Land.

pied the city of Mexico and some of the neighboring country. They had government and religion much better developed than the bar-

FIG. 30.

The pueblo of Taos in New Mexico. Notice the ladders leading to the roofs upon which are the house entrances.

barous and savage tribes. They mined gold and silver and manufactured the metals into various articles ; they wove blankets, and ornamented their pottery and their buildings in an artistic manner. Living the quiet life of the farmer, the Aztecs perferred peace to war, and a settled home to the nomadic life of the hunter.

Fig. 31.
Indian carrying a decorated pottery jar.

While some tribes thus approached a state of civilization, the Indians, as a race, never became a powerful people. For this there are several reasons. Instead of forming one great confederacy and living at peace with one another, they were divided into many tribes. Each tribe had a certain area over which it could roam and hunt; but if it encroached upon its neighbors, war followed. Under these circumstances it was difficult for one tribe to advance to a much higher state of civilization than the others.

The level nature of the country rendered this difficulty all the greater. Had the surface of North America been very mountainous, some tribes might have been so protected by surrounding mountain walls as to dare to devote themselves to other work than war. Then they might gradually have collected wealth and developed important industries; but the vast plains of the Mississippi Valley, and the extensive plains and low mountains of the East, allowed little protection. If any one tribe had built good homes on these plains, and collected treasures within them, the neighboring Indians would have felt that a special invitation had been extended to attack them. The Aztecs were continually in danger from this cause. However, the fact that they were *partly* protected by mountains and deserts, was one of the reasons why they were more civilized than the Indians of the northeast.

Fig. 32.
Indian woman carrying her baby, or *pappoose*.

Another serious obstacle to the advancement of the Indians was the

fact that they possessed no domestic animals for use in agriculture. The horse, cow, ass, sheep, goat, and hog were unknown to them; and, without these, farm work becomes the worst drudgery, because every product must be raised by hand.

Again, although there was much game, the supply was never sufficient to support a dense population for a long period. Even the scattered Indian population was obliged to wander about in search of it. This prevented them from living quietly and finding time for improvement. All these facts worked against the advancement of the Indians; but they proved of great advantage to the whites, making it far easier than it would otherwise have been for them to obtain possession of America.

The Spaniards. — The astonishment of Europe was great when it was proved that there were vast territories on this side of the Atlantic. America was pictured as containing all sorts of treasures, and European nations vied with one another in fitting out expeditions to take possession of them.

The Spaniards naturally led, for they were then one of the most powerful nations of Europe and had sent out Columbus as their representative. Leaving Palos in Spain on his first voyage, he was carried southwestward by the winds to one of the West Indies, a point much farther south than Spain itself. Find on a globe the point on our coast that is about as far north as Madrid.

The section reached by the Spaniards had a climate similar to that of their own country, and they easily made themselves at home there and soon came into possession of most of South America, Central America, Mexico, and southwestern United States. They had one advantage over the English and French who settled farther north: the portion of the continent that they discovered is so narrow that they easily crossed it, and thus enjoyed the privilege of exploring the Pacific coast also. It was because of this fact that the Spanish race settled the western coast as far north as San Francisco.

After robbing the Aztecs of immense quantities of gold and silver, the Spanish converted the natives to Christianity, and introduced many Spanish laws and customs. They cruelly mistreated the natives, killing many and enslaving others, and forcing them to work in the mines and fields. While the invaders were able to conquer the semi-civilized Aztecs and the barbarians of the islands, they made very little progress in subduing the

more savage tribes. To this day, in fact, there are tribes of Indians in Mexico and Central America that have never been conquered.

The French. — The French began their settlements in a very different quarter, being first attracted to our coast by the excellent fishing on the Newfoundland banks. Soon the fur trade with the Indians proved profitable, and the French took possession of Nova Scotia and the region along the St. Lawrence River and the Great Lakes.

The value of the fur trade, and a desire to convert the Indians to Christianity, led the French far into Wiconsin and to the head waters of the Mississippi River. Making their way southward to the mouth of that river, they took possession of the whole Mississippi Valley (Fig. 33), and called it Louisiana in honor of their great king, Louis XIV. In order to hold this vast territory, they established a chain of trading posts and forts from the Gulf of Mexico to the Gulf of St. Lawrence. One of the most important of these forts stood where Pittsburg now stands.

What special advantage had the French for reaching so much of the interior of the continent? Why should they not have proceeded westward to the Pacific? Many places in the St. Lawrence and Mississippi valleys still preserve French names, as Lake Champlain, Marquette in Michigan, La Salle in Illinois, St. Louis, and New Orleans.

The English. — The Spanish and French left only a narrow strip along the Atlantic coast for other nations. Among those who attempted settlements were the Dutch in New York and the Swedes in Delaware. But the English, settling at various points along the coast, soon obtained the lead. They captured New York City (then called New Amsterdam) from the Dutch, and extended their settlements along most of the coast from Florida to Nova Scotia.

In several respects the portion that fell to the English seemed much less desirable than that held by the Spanish and French; yet the English-speaking race has managed, not only to retain this, but to add to it most of the possessions of the other two. At the present time, the control of the entire continent, with the exception of Mexico, Central America, and a few small islands, is in the hands of either the United States or Great Britain.

There are, of course, good reasons for this strange result. No doubt original differences between these three races is one cause; but there are others also. In the case of the Spanish, the climate has been one factor; for in a large part of their territory the weather is too warm to produce energetic people. In very cold countries, as in the land of the Eskimos, so much labor is required in merely obtaining food and shelter, that little time and strength are left for general improvement. The struggle is too severe to allow progress.

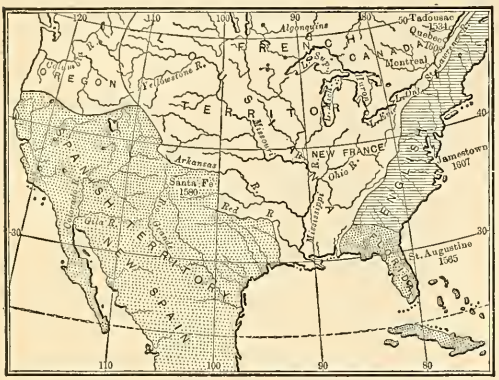


FIG. 33.

Map showing the claims of France, England, and Spain upon the territory of central North America in 1760.

In warm countries, on the other hand, the same effect is produced, but in the opposite way. So *little* energy is required to find sufficient food that the people do not *need* to exert themselves, and hence do not. By taking a few steps, the Central American can find bananas and other nourishing food at almost any season of the year; why then should he work? The people, therefore, lose the inclination to bestir themselves, or, in otherwords, become too lazy to improve their condition.

Another reason why the Spaniards have not developed is found in their relation to the Indians. Although robbing and enslaving them, they at the same time married them freely, so that, in time, half-breeds have come to make up more than half the population. These half-breeds are an ignorant class, far inferior to the Spaniards themselves, and so backward (Fig. 34) that they still follow many of the customs of the Aztecs.

FIG. 34.

A primitive Mexican cart with wooden wheels, such as can still be seen in that country.

The French likewise intermarried with the Indians and adopted some of their customs, although not to so great an extent as the Spaniards. Their climate was, on the whole, more favorable than that of the Spanish;

for, though cold in the St. Lawrence Valley, the temperature was conducive to effort. But one of their greatest difficulties arose from the fact that the few scattered settlers were unable to protect all of the vast territory to which they laid claim.

As for the English, the temperate climate of their section is the best in the world for the development of energy. The warm summers allowed abundant harvests; but the long, cold winters forced the settlers to exert themselves to store supplies for the cold season. Since it required only a reasonable amount of labor to obtain the necessities of life, time and energy were still left for improvement.

In their treatment of the Indians, the English and French were less cruel than the Spaniards; but unlike both French and Spanish, the English would not intermarry with savages. Consequently, in the wars with the French, the English were not hampered by great numbers of half-civilized persons, and could act with more intelligence, speed, and force. Their relation to the Indians, however, placed them at a disadvantage in one respect; for, during the fights with the French, a majority of the Indians were enemies of the English.

The fact that the English were hemmed in by forest-covered mountains on the west, and by the French and Spanish on the north and south, also proved an advantage; for on that account they were kept close together, and were easily able to combine their forces when wars arose.

These are some of the reasons why the English-speaking race has won its way on the continent against both Spanish and French. Spain has steadily lost ground, having recently given up Cuba and Porto Rico to the United States; and France has had no claim upon the continent since 1803. The Spanish race still occupies Mexico and Central America, while French is even now spoken by many people in New Orleans, Quebec, and Montreal.

Westward Migration.— After the Revolutionary War, by which the Thirteen Colonies gained their independence from Great Britain, an active westward movement began. For a long time the Appalachian Mountains had stemmed the tide of migration (Fig. 35). But at last numbers of pioneers found their way, along the river valleys, to the other side of these mountains. There they discovered fertile plains, free from rocks and woods, and ready for the plough; and their enthusiastic reports quickly drew hundreds of thousands after them.

The westward advance pushed the frontier line on and on until

the semi-arid plains of the West were reached. Then, in 1848, the discovery of gold in California produced a wave of excitement that carried hosts of adventurers across the Rockies to the Pacific coast. After this the western part of the United States was rapidly explored and settled.

Slavery. — While the Indians of the East were being killed in war and driven westward, negroes were being brought from Africa. There are now fully eight million blacks in the United States, which is nearly one-ninth of our entire population, and thirty times the number of Indians.

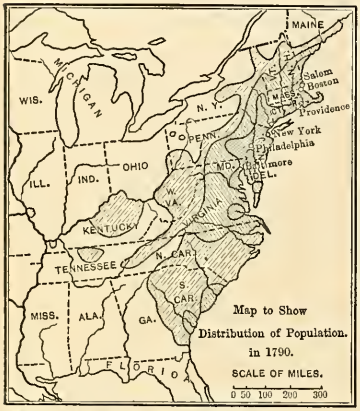


FIG. 35.

Map to show the settled part of the United States in 1790. Notice the cities named; each of these had over 5000 inhabitants. Which are now among the great cities of the country? What about Chicago?

Slavery was first introduced into America by the Spaniards, who made slaves of the Indians, and afterward imported negroes from Africa. The first negro slaves in the British colonies were brought to Virginia in 1619, but their number increased very slowly until the close of that century. The demand for cheap labor was partly supplied by criminals sent over from England, and by other immigrants who gave their services for a few years in payment for their passage across the sea. Many of these were men and women of good character, who became excellent citizens.

Negro slaves were brought to all the colonies, but they soon proved a much more profitable investment in the South than in the North. In New England the farms were small, the products were numerous and their cultivation required considerable skill. Moreover, the climate was severe for natives of tropical Africa. On the other hand, the Southern climate was well suited to them; and the simple routine work upon the great tobacco, cotton, sugar, and rice

plantations was such as they could easily perform. Accordingly, the number of negroes increased in the South, while slavery gradually disappeared from the North.

Immigrants to America. — Europe and Asia have poured forth a stream of immigrants into this country. Our increase in population, from a little over three millions at the close of the Revolutionary War to over seventy-six millions at present, has been largely due to this steady stream from abroad. Nearly every foreign nation is represented, and upon the streets of our larger cities may be heard the languages of most of the civilized peoples of the globe.

The greater part of our immigrants has come from northern Europe, especially from the British Isles, Germany, and the Scandinavian peninsula (see Appendix); and great numbers of them have settled in the cities. More recently a flood of immigration from southern Europe has brought us less educated and less desirable people. At one time many Chinese threatened to come, and laws preventing their coming had to be passed. We have laws, also, excluding paupers, criminals, and laborers who are brought here by contract. To others the country is free, though many believe that very ignorant persons should be prevented from immigrating here.

FIG. 36.
A negro group in the South.

It has been our mission to welcome these strangers, and, in spite of their varying ideas, customs, and languages, to teach them the principles of a republican form of government, to educate them, and welding them into an harmonious body, to make them good citizens and true Americans. It is not strange if some mistakes have been made in the process. It is a task that no other nation has ever performed on so grand a scale. Nevertheless, the fact that so few of the many foreigners who settle among us desire to return to their

native lands is proof that they have not been disappointed in their expectations ; and it suggests reason for a well-founded pride in the government of the United States, and a hope for its future.

Review Questions. — (1) Of what importance is climate? (2) Why are there no large trees in the cold North? (3) Describe the vegetation there. (4) Tell about the animals that live on the land there? (5) Why are there more animals in the sea? (6) What kinds live there? (7) How do arid land plants protect themselves? (8) Tell what you can about the animals living in the arid lands. (9) Why should there be more life in the tropical zone? (10) Name some of the animals living there. (11) What can you say of the plants of the moist temperate zone? (12) Of the animals? (13) Of the bison? (14) What cultivated plants and domesticated animals has North America supplied?

(15) Describe the difficulties that the Eskimos encounter. (16) Give some examples of Indian names. (17) Describe the life of the different kinds of Indians. (18) What causes prevented the Indians from becoming more civilized? (19) Give a reason why the Aztecs were able to advance. (20) What advantage did their location in southern North America give the Spaniards? (21) How did the Spaniards treat the Indians? (22) What attracted the French to America? Where did they settle? (23) What other nations settled in the East? (24) What has been the fate of the Spaniards and French in America? (25) Why have the English-speaking people come into possession of the greater part of the continent? (26) What interfered with the westward migration of the English? (27) How was this migration finally brought about? (28) Tell about the beginnings of slavery in America. (29) Why was it more successful in the South than in the North? (30) Where do our immigrants come from? (31) What is our mission toward them?

Suggestions. — (1) Examine some century and cactus plants. (2) Find some furniture made of mahogany or other tropical wood. (3) Visit a greenhouse to see orchids. (4) Collect pictures of native plants and animals of North America. (5) Collect samples of different American woods. (6) What does the eagle signify as our national emblem? On what coins is it found? (7) What have you read about the bison? About Indians? Write a story about each. (8) Write a story about slavery times. (9) Do you know any of the negro melodies that were sung on the plantations?

For References, see *Teacher's Book*.

III. LATITUDE, LONGITUDE, AND STANDARD TIME

Latitude and Longitude

Need of a Means for locating Places. — In your study of geography you have doubtless noticed that it has frequently been necessary to refer to lines upon the earth, such as the Tropic of Cancer, the Equator, the Arctic Circle, etc., in order to locate certain places and the boundaries of the zones. But these lines are far apart, and there are many places between them to which reference must often be made. For instance, suppose we wished to state on what part of the earth London is situated; how could it be done? Of course, by taking a long time, it would be possible to describe just where this city is; but cannot some more convenient way be devised?

The difficulty is much the same as that which arises in a large city, where there are thousands of houses. No one person knows who lives in most of them, and if a stranger were looking for a friend, he might have much trouble in finding him.

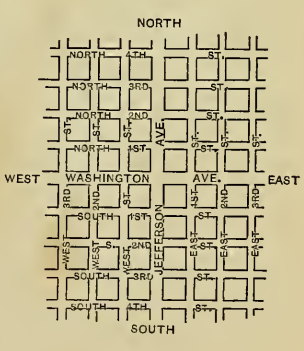


Fig. 37.

Map of a part of a city, to illustrate the need of naming streets.

The Streets of a City. — In this case the problem may be solved in a simple manner. A street running east and west may be selected to divide the city into two parts (Fig. 37). Any place north of this street is spoken of as being on the north side, and south of it as being on the south side. The streets to the north and south are numbered from this, as North 1st, North 2d, North 3d; and South 1st, South 2d, South 3d, and so on. Then if a man says that he lives on North 4th Street, one knows immediately that he

lives on the north side, and that his house is on the 4th street from this central one.

But a city also extends a long distance east and west, and we need to know on what part of 4th street this house is to be found. To answer that question, another street running north and south, and crossing the east and west ones, may be selected to divide the city into east and west parts. The streets on the two sides are numbered from this one, as East 1st, East 2d, West 1st, West 2d, etc. (Fig. 37).

Then if a man lives on the corner of North 4th and East 3d streets, one knows not only that his home is *north* of a certain line, but *east* of another line. If the blocks, or the space between any two streets, are always the same, it will also be easy to tell the distance from each of the central streets to the house.

This plan is not necessary in small towns and villages, because the people there know one another, and are able to direct strangers easily. Few, if any, cities follow *exactly* the scheme here given; but many have a system of naming or numbering streets somewhat similar to this.

If you live in a large city, perhaps you can tell just how your streets are named or numbered.

Distance North and South of the Equator (*Latitude*). — Places upon a globe are located in much this manner. For example, the equator, which extends around the earth midway between the poles, corresponds to the dividing street running east and west. The distance between the equator and the poles, on either side, is divided into ninety parts (Fig. 38), corresponding, we might say, to the blocks in a city. These, however, are each about sixty-nine miles wide and are called *degrees*, marked with the sign °.

In making maps people think of a line, or a circle, extending around the earth sixty-nine miles north of the equator, and called a *circle of latitude*. Any point upon it is one degree (1°) north of the equator, or 1° *North Latitude* (abbreviated to N. Lat.). Similar lines are imagined 2°, 3°, and so on up to 90°, or to the north pole.

Since all points on any one of these circles are the same distance from the equator, and from the other circles of latitude, the lines are *parallel;* and on that account they are called *parallels of latitude.* See a globe.

The same plan is followed on the south side, places in that hemisphere being in *South Latitude* (S. Lat.).

If one finds that a certain place is on the 8th, or the 50th, or some other parallel north of the equator, he knows how far it is north of the equator. San Francisco is close to the 38th parallel, Chicago close to the 42d, and St. Paul on the 45th (Figs. 116 and 145). Knowing this, it is easy to see that Chicago is 4°, or about two hundred and seventy-six miles, farther north than San Francisco, while St. Paul is 3°, or over two hundred miles farther north than Chicago.

FIG. 38.

The globe, showing the two hemispheres and some of the circles of latitude.

From this it is evident that we can easily find the latitude of a given place by the help of these parallels, for *latitude is the distance north or south of the equator.*

Of course there are no marks *upon the earth* to show where these lines run, but they are of great use *on maps,* because they help us to locate places. Small maps and globes cannot well show the entire ninety parallels on each side of the equator, so that usually only every fifth or tenth one is drawn. Examine some maps (such as Figs. 44 and 116), to see which ones are given. Near what parallel do you live?

East and West Distances on the Earth (*Longitude* [1]). — But how about distance east and west? It is about twenty-five thousand miles around the earth at the equator, and some means must be found for telling on the map how far places are from each other in these directions.

Imaginary lines are used for this purpese, as before; but this time they extend north and south from pole to pole (Fig. 39), and

[1] The ancients thought that the world extended farther in an east and west than in a north and south direction Therefore they called the east and west, or *long* direction, longitude; the north and south direction, latitude.

are called *meridians*, or lines of *longitude*. In the case of the city it makes little difference what north and south street is chosen from which to number the others. It is only necessary that a certain one be *agreed upon*.

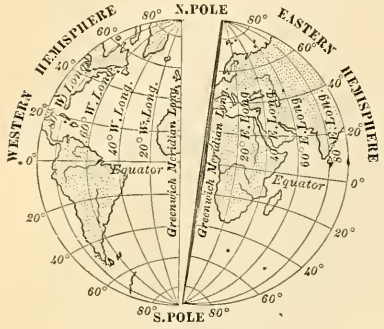


FIG. 39.

The earth, cut in halves along the Greenwich meridian, showing some of the meridians. The meridian 20° is usually considered the dividing line between the eastern and western hemispheres.

It is the same with these meridians. No one is especially important, as the equator is, and consequently different nations have selected different lines to start from. In France the meridian extending through Paris is chosen, in England that through Greenwich near London, and in America the one passing through Washington is sometimes used. But it is important that all people agree on some one, so that all maps may be made alike. On that account many countries start their numbering with the meridian which passes through Greenwich. The maps in this book follow that plan.

In Greenwich is a building, called an observatory, in which there is a telescope for the study of the sun, moon, and stars. As these heavenly bodies are of great help in finding the latitude and longitude of places, Greenwich seemed to the English a fitting place from which to begin numbering their meridians.

Commencing with this meridian as 0° longitude, people measure off degrees both east and west of it, and think of lines as extending north and south toward the poles,

FIG. 40.

A view looking down on the north pole, to show how the meridians come to a point at the north pole. Notice that if the 0° meridian were continued it would unite with the meridian 180°.

as they do of circles of latitude running parallel to the equator. Thus there is a meridian 1° west, another 2°, a third 3°, etc. Going eastward, they number 1°, 2°, 3° in the same way.

Any place on the 3d meridian west of Greenwich is said to be in 3° *West Longitude* (W. Long.); if on the 60th meridian, 60° W. Long. Any place on the 20th meridian *east* of Greenwich is in 20° *East Longitude* (E. Long.). New York is 74° W. Long., while San Francisco is about 123° W. Long.

The 180th meridian is a continuation, on the other side of the earth, of the Greenwich or zero meridian (Fig. 40), and the two together make a complete circle. Hence we may speak of *circles of longitude* as well as circles of latitude. Why must the meridian marked 180° E. Long. be the same as the one marked 180° W. Long? Which meridian passes near New York? Denver?

If a large map is made of a small part of the earth, the circles of latitude and longitude are too far apart to be of much use. Therefore, it is customary to divide each degree into sixty parts called *minutes,* just as each hour is divided into sixty parts. Each minute of latitude and longitude is divided into sixty parts called *seconds,* as each minute of time is divided into sixty seconds. The sign for a degree is °; for a minute ′; for a second ″. Thus 60 degrees, 40 minutes, and 20 seconds north latitude is marked 60° 40′ 20″ N. Lat. Examine some map of a small section to find these signs.

Knowing the latitude and longitude of any place, it can, by the aid of a map, be as easily located as a house in a great city. For instance, Denver is about 40° N. Lat. and 105° W. Long. It is therefore far to the north and west of New Orleans, which is about 30° N. Lat. and 90° W. Long.

Find the latitude and longitude of some of the large cities on the map (Fig. 46). Notice also that only every fifth meridian is marked. Compare this with the map of New England (Fig. 49). Since this map represents a smaller section of country, more meridians can be drawn upon it.

The circles of latitude are parallel to the equator and to each other, as you can prove by measuring the distance between them on a globe. But the meridians cannot be parallel on a globe, since they start from the poles and spread farther and farther apart until the equator is reached. Examine some of the maps in this book to see that the meridians are not parallel, while the lines of latitude are.

You can see how this is by taking the peeling from an orange (Fig. 41). The edges of each of the quarters spread far apart in the middle, or equator, but come together at the ends, or poles, of the orange.

Fig. 41.

An orange with a part of the peeling removed to show how the lines converge toward the poles, as the meridians converge on the globe.

A degree of longitude is a little over sixty-nine miles at the equator; but it decreases more and more as the poles are approached, until at the poles it is nothing, because all the meridians meet there at one point. Examine Figure 40 or better still, a globe, to see that this must be true.

How a degree of latitude happens to be slightly more than 69 miles is easily understood. The length of a circle extending around the earth through the poles is about 25,000 miles; and this distance is thought of as being divided into 360 equal parts or degrees, that being a number that is exactly divisible by 2, 3, 4, 5, 6, 8, 9, and still other numbers. Divide 25,000 by 360.

Keeping in mind the number 360, you can understand why the distance from the equator to either pole is 90°, for that is one-fourth of the entire distance. How many miles in 90°?

You can now find the width of the five zones (Fig. 291). The tropical zone is bounded on the north by the Tropic of Cancer and on the south by the Tropic of Capricorn, each of which is $23\frac{1}{2}°$ from the equator. The Arctic and Antarctic circles are likewise $23\frac{1}{2}°$ from the poles. Give the width of each of the zones in degrees of latitude. In miles. What is the greatest width of the United States in degrees of latitude? In miles? How far is the southern extremity of Florida from the Tropic of Cancer? How far is New Orleans from that tropic?

Standard Time

If you were to travel from New York to San Francisco, you would find on arriving that your watch was three hours too fast. The reason is that the rotation of the earth, from west to east, causes the sun's rays to fall upon the Atlantic coast more than three hours sooner than upon the Pacific, so that when it is noon in New York, it is about nine o'clock in the morning at San Francisco.

Measuring from east to west, every place has a different time by the sun, and some years ago each city had its own *sun* or *solar* time. But when railways were built, connecting many places, these differences became a source of constant annoyance to the traveller. As his watch showed the time of only one place, perhaps a city some distance to the east or west, he could not tell exactly when a train would leave, or when his meals would be served.

In order to avoid all this trouble our country has been divided into belts, in each of which all the railways, and most of the towns, have the same time. Since this time is the *standard for all*, these belts are called the *Standard Time Belts*. The one in the extreme east is called the *Colonial Belt;* that next west of it, which includes New England, New York, and some of the other Eastern States, is called the *Eastern Time Belt*. What are the names of the others? (Fig. 42.)

In travelling across the country from New York to San Francisco, one starts with his watch set at the standard time for the Eastern Time Belt. After a while he comes to a place where the time changes one full hour; then he has Central Time. Going still farther west to the Mountain Belt, the watch is again set back one full hour; what is done when the Pacific Belt is reached? In this way, only a few changes of the watch have to be made; and, as long as one remains in a certain belt, he is sure of the time of day.

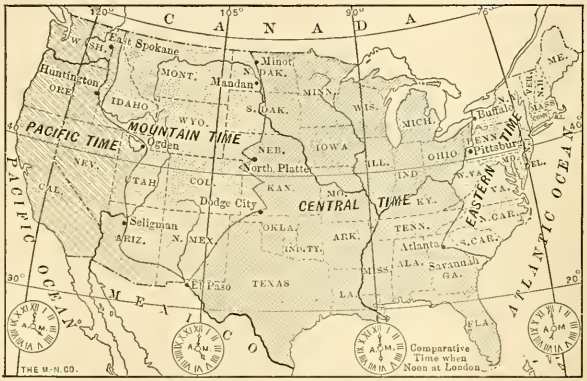
Our study of longitude helps us to understand what determines the places for changing this time. When the sun is rising at a certain point on a meridian, it is rising at every other point on that meridian.[1]

The earth makes one complete rotation every 24 hours, so that sunrise, noon, and sunset reach each of the 360 meridians in the course of the day of 24 hours. Dividing 360 by 24 gives 15; that is the number of meridians that the sunrise or sunset pass over in a single hour. Therefore, if in one place, as at Philadelphia, on the

[1] It is understood, of course, that this does not apply to the frigid zone, where the sun does not rise at all during a part of the year, and where it does not set during another part of the year.

75th meridian, it is sunrise at six o'clock, it will be sunrise one hour later at all points just 15° west of this, or on the 90th meridian.

This explains what has determined the boundary lines of the time belts. The time selected for the Eastern Belt is that of the 75th meridian; for the Central Belt, that of the 90th meridian, which is just one hour later. What meridian is selected for the Mountain Belt? (Fig. 42.) For the Pacific Belt? Each of these meridians runs through the *middle* of the belt whose time it fixes,



STANDARD TIME IN THE UNITED STATES.

FIG. 42.

To show the standard time belts of the United States, — the actual boundaries being irregular, as you see.

so that the eastern boundary of the Central Time Belt is half-way between the 75th and 90th meridians, that is West Longitude $82\frac{1}{2}°$; and the western boundary is half-way between the 90th and 105th meridians, or $97\frac{1}{2}°$ West Longitude.

In reality the railways do not change their time *exactly* according to these boundaries, for oftentimes the meridians extend through very unimportant points, or even cross the railways far out in open country. Instead of following the exact boundaries, they select well-known places, like Buffalo, Pittsburg, and Atlanta, at which cities the change is made from Eastern to Central time. Therefore, the boundaries which represent the places where the railways *actually* change their time are somewhat irregular, and not always on the proper meridian (Fig. 42).

You see that the object of these Time Belts is to save annoyance, and that *for most places the standard time is incorrect time.* For

instance, noon by the standard time is not the real noon for any places in the United States excepting those along the 75th, 90th, 105th, and 120th meridians.

In order that our system may accord with that of other parts of the world, the time of the Greenwich meridian is taken as a basis. Thus the whole world, like the United States, may be divided into standard time belts, with a change of an hour at every fifteenth meridian.

QUESTIONS. — (1) How may an east and west street be used in a city to locate houses? (2) How may a north and south street be so used? (3) Make a plan of a city showing two central streets and others numbered from them. (4) What corresponds to the central east and west street in locating places upon the globe? (5) Into how many parts is the distance between the equator and each pole divided? (6) What is each of them called? (7) What is meant by saying that a place is in 1° N. Lat.? (8) How far apart are the circles of latitude? (9) Why are these circles called parallels? (10) What is S. Lat.? (11) What is a meridian? (12) Why is it necessary to have them upon maps? (13) Which meridian is most commonly chosen as zero? Why that one? (14) How high do the numbers of the meridians run? (Fig. 40.) (15) What is meant by saying that a place is in 3° E. Long.? In 90° W. Long.? (16) What is meant by circles of longitude? (17) What subdivisions of a degree are there? Why are they necessary? (18) Show that meridians are not parallel. (19) What is the length of a degree of longitude at the equator? (20) Show how a degree of latitude happens to be about 69 miles. (21) Explain why the time is continually changing as one goes west. As he goes east. (22) How has this caused annoyance in travelling? (23) What remedy has been found? (24) What are the names of the Standard Time Belts in the United States? (25) What is the difference in time between the belts? (26) Which meridians are used to fix the boundaries? Why these? (27) Show the boundaries on the map (Fig. 42). (28) Why is standard time really incorrect for most places?

SUGGESTIONS. — (1) Find how the streets of Washington have been numbered and lettered. (2) What is the latitude and longitude of Boston? Of Washington? Of Chicago? Of your nearest large city? (3) Find some cities that are on or near the 42d parallel of latitude. (4) What place is in 25° N. Lat. and 81° W. Long.? Near 40° N. Lat. and 75° W. Long.? (5) Make a drawing showing several of the meridians. (6) Find places that have nearly the same latitude as your home. (7) Where and how much would you change your watch in travelling from San Francisco to Chicago? (8) What is the difference in time between Baltimore and Denver? (9) Examine some railway time-tables to see how they indicate the changes in time. (10) What is the difference where you live between Standard Time and solar time? (11) Show on a globe or map where a shid would be in the Atlantic when in zero latitude and longitude.

IV. UNITED STATES

The great continent of North America is under the control of different nations. The Dominion of Canada is a British colony, and so are Newfoundland and Labrador, and some of the islands south of the United States. Name them. Greenland and Iceland are Danish colonies ; but the countries of Central America, Mexico, and the United States are independent nations. The United States also includes Alaska, the island of Porto Rico, the Philippines, and some other islands of the Pacific. In addition to this, Cuba is under our protection. What is the name of the group of islands to which Cuba and Porto Rico belong ?

Our country is so large, and so different in the various parts, that in order to study it in detail we must divide it into sections. The state boundaries might serve as a means of thus dividing the country; but there are far too many of them. How many states are there? Draw a sketch map of the country, and place upon it the boundaries and names of all the states. What is a state? (See First Book, p. 94.) Find out about your own state: its government, its capital city, the name of the governor and other important facts.

In studying the different states it is convenient to group them into five sections and study each group by itself. The first states selected for this study are the six in the northeastern part of the country, which are commonly called the New England States. As you study each of these groups of states, a very important point to notice is the *scale* upon which the map is drawn.

ARCTIC OCEAN
Bering Sea
Baffin Bay
Hudson Bay
PACIFIC OCEAN
ATLANTIC OCEAN
Montreal
Boston
Buffalo
Milwaukee
Detroit
Chicago
Cleveland
New York
Pittsburg
Philadelphia
San Francisco
Baltimore
Washington
St. Louis
Cincinnati
New Orleans
Gulf of Mexico
Havana
Mexico
Caribbean Sea
NORTH AMERICA.
Density of Population.
Less than 1 per Square Mile.
1-25 " " "
25-125 " " "
125-500 " " "
Cities with over 200,000 Inhabitants are shown.

FIG. 43.

FIG. 44.

MAP QUESTIONS. — This map and the relief map (Fig. 8) show the great Western highlands, the lower highland region of the East, and the great trough between. What are the names of the large rivers that drain the different sections? In which direction does each flow, and into what waters does each empty? In what part are most of the lakes found? Why? Name and locate each of the large peninsulas, islands, bays, gulfs, and seas. Draw an outline map of the continent. Use it to

FIG. 45.

Physiographic map of the United States, giving the names of the principal mountains, plateaus, and plains.

3
125°
120°
115°
110°
105°
Longitude
100° West
45°
40°
35°
30°
25°
C. Flattery
Vancouver
Victoria
Seattle
WASHINGTON
Olympia
Tacoma
Mt. Rainier
Spokane
Portland
Columbia R.
Mt. Hood
Salem
OREGON
Cascade Mts.
Mt. Shasta
C. Mendocino
Coast Range
Sacramento R.
Sacramento
San Francisco
Sierra Nevada
CALIFORNIA
Yosemite Valley
San Joaquin
Tulare L.
Mt. Whitney
Pt. Conception
Los Angeles
San Diego
PACIFIC OCEAN
LOWER CALIFORNIA
Gulf of California
NEVADA
Virginia
Carson City
Great Salt Lake
Ogden
Salt Lake City
Wasatch Mts.
UTAH
Grand Canon
Colorado R.
San Francisco Mt.
ARIZONA
Phœnix
Gila R.
Tucson
MONTANA
Helena
Butte
Rocky Mountains
Missouri R.
Yellowstone R.
IDAHO
Boise
Snake R.
YELLOWSTONE NATIONAL PARK
WYOMING
Cheyenne
Grand Jc.
Denver
Leadville
COLORADO
Pikes Peak
Pueblo
Santa Fé
Albuquerque
NEW MEXICO
Pecos R.
Canadian R.
Arkansas R.
KANSAS
OKLAHOMA
Guthrie
Red Brazos
TEXAS
Austin
San Antonio
Rio Grande
MEXICO
DOMINION
Regina
Winni
NORTH DAKOTA
Bismarck
Fargo
Deadwood
Black Hills
Pierre
SOUTH DAKOTA
Sioux Fal
NEBRASKA
Platte R.
Lincol
Longitude 100° West

F

95° Greenwich
90°
85°
80°
75°
70°
65°
45°
40°
35°
30°
25°
CANADA
Lake of the Woods
L. Superior
Duluth
Sault Ste. Marie
MICHIGAN
L. Huron
L. Michigan
Grand Rapids
Lansing
Detroit
Toronto
L. Ontario
Niagara Falls
Buffalo
L. Erie
Erie
Ottawa
Montreal
Quebec
St. Lawrence R.
Adirondack Mts.
Saratoga Spgs.
Albany
Rochester
NEW YORK
Catskill Mts.
Hartford
Fredericton
MAINE
Augusta
MT. DESERT I.
Portland
Concord
VERMONT
N. HAMP.
MASS.
Boston
C. Cod
Providence
Newport
CONN.
R. I.
Long I.
New York
Trenton
Camden
Atlantic City
Philadelphia
Pittsburg
Harrisburg
PENNSYLVANIA
Delaware R.
Baltimore
Annapolis
Del. L.
Chesapeake Bay
Norfolk
Richmond
Petersburg
Raleigh
C. Hatteras
NORTH CAROLINA
Wilmington
SOUTH CAROLINA
Columbia
Charleston
Savannah
GEORGIA
Atlanta
Jacksonville
St. Augustine
FLORIDA
Tampa
Tallahassee
Mobile
Montgomery
ALABAMA
Vicksburg
Jackson
MISSISSIPPI
New Orleans
Baton Rouge
LOUISIANA
Galveston
Red R.
Sabine R.
Mississippi R.
Tennessee R.
Cumberland R.
Nashville
TENNESSEE
Memphis
Chattanooga
Knoxville
Kentucky R.
Louisville
KENTUCKY
Frankfort
Cincinnati
Columbus
Wheeling
OHIO
Cleveland
Toledo
Ft. Wayne
INDIANA
Indianapolis
Evansville
Wabash R.
Springfield
ILLINOIS
Peoria
Chicago
Milwaukee
Madison
WISCONSIN
St. Paul
Minneapolis
Mississippi R.
Sioux City
IOWA
Des Moines
Kansas City
St. Louis
Jefferson City
MISSOURI
Ozark Mts.
Cairo
Mammoth Cave
Fort Smith
ARKANSAS R.
Little Rock
INDIAN TERRITORY
Missouri R.
Opelika
Sioux City
Ohio R.
Potomac R.
W. Virginia
Washington
Virginia
Charleston
Shenandoah R.
James R.
Appalachian Mts.
Mt. Mitchell
Savannah R.
Chattahoochee R.
Alabama R.
Tombigbee R.
Pearl R.
Big Sandy R.
Kanawha R.
Scioto R.
Wabash R.
Illinois R.
Des Moines R.
Missouri R.
Arkansas R.
Red R.
Sabine R.
Brazos R.
Rio Grande R.
Nueces R.
Pecos R.
Colorado R.
Gila R.
Salt R.
Platte R.
Kansas R.
Osage R.
Grand R.
Missouri R.
Yellowstone R.
Milk R.
Missouri R.
Big Horn R.
Powder R.
Cheyenne R.
Missouri R.
Niobrara R.
Missouri R.
Big Sioux R.
Missouri R.
Minnesota R.
Red R.
Mississippi R.
Wisconsin R.
Rock R.
Illinois R.
Mississippi R.
Ohio R.
Kentucky R.
Cumberland R.
Tennessee R.
Mississippi R.
Yazoo R.
Mississippi

FIG. 47.

Relief map of the United States. Study this map carefully to see the areas of plains, plateaus, and mountains. What is the name of each division? (Fig. 45.) On a sketch map of the United States write the names of the different physiographic divisions in their proper places (as in Fig. 45). Could you not make a sand or clay model of the United States, showing, in a general way, the greater highlands and lowlands?

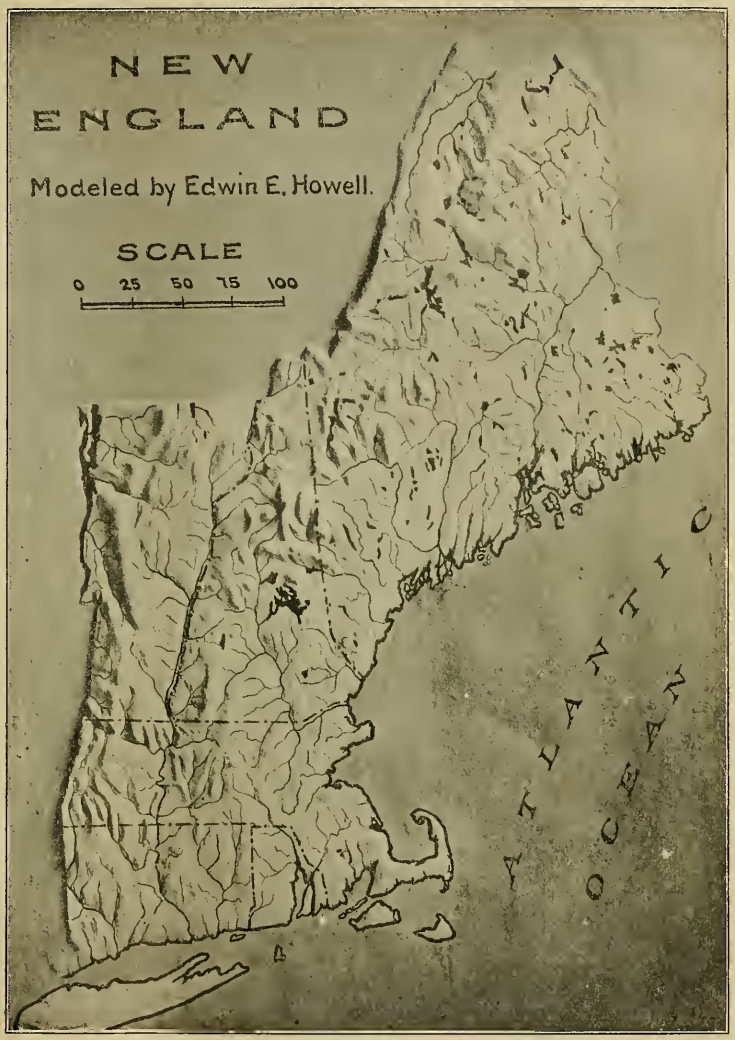


FIG. 48.

Relief map of New England. Describe the relief: (*a*) the location of the mountains, (*b*) the lowlands, (*c*) the lakes, (*d*) the drainage, (*e*) the nature of the coast line.

74°
72°
70°
68°
46°
DOMINION OF CANADA
NEW BRUNSWICK
QUEBEC
MAINE
Murray Bay
R. St. Lawrence
St. Maurice R.
Mattawin R.
Quebec
Levis
ISLE OF ORLEANS
Three Rivers
L. St. Peter
Chaudiere R.
St. Francis R.
Montreal
Richelieu R.
Sherbrooke
Lake Memphremagog
Swanton
Missisquoi R.
Newport
St. Albans
Lamoille R.
Lake Champlain
Mt. Mansfield 4,364
Winooski
Burlington
Stowe
Montpelier
Winooski R.
Adirondack Mountains
Lancaster
St. Johnsbury
Littleton
Berlin
Mt. Washington 6,293
Androscoggin R.
Paris
Rumford Falls
Farmington
Rangeley Lakes
Mt. Abraham 3,388
Saddleback Mt.
Kennebec R.
Dead R.
Skowhegan
Fairfield
Waterville
Augusta
Hallowell
Gardiner
Belfast
Castine
Bar Harbor
Bucksport
Oldtown
Bangor
Penobscot R.
Piscataquis R.
Mattawamkeag R.
Mt. Katahdin 5,200
Chesuncook Lake
Moosehead Lake
Pemadumcook Lake
Penobscot R.
Heron L.
Chamberlain Lake
Aroostook R.
Wallooostook or R. St. John
Allegash R.
Eagle Lakes
Caribou
Fort Fairfield
Presque Isle
Houlton
Grand Lake
St. Croix R.
Calais
Eastport
Lubec
Machias R.
Machias
Machias Bay
Passamaquoddy Bay
SEAL I.
Tobique R.
R. St. John
St. Francis R.
R. St. John

FIG. 49.

MAP QUESTIONS. — (1) Name the states of this group. (2) What is the capital of each? (3) Where are the mountains? (4) Into what bay does the Penobscot River flow? (5) What large island just east of it? (6) Find three large lakes. In which state is each? (7) Where are the largest cities? Why there? (8) What cape is about twenty-five miles north of Boston? (9) What cape is southeast of Boston? (10) Find Massachusetts Bay. (11) Find Cape Cod Bay. (12) What two large islands lie south of Masssachusetts? (13) What two bays near them? (14) What large island lies south of Connecticut? (15) In what state is it? (See Fig. 67.) (16) What waters separate it from Connecticut?

FIG. 50.

Boston and vicinity. Also small maps of Providence, Portland, and Worcester. Notice the steamship and railway lines converging at Boston. Also the number of cities near Boston. The reservoirs near Worcester are used to store water for power.

V. NEW ENGLAND

Physiography and Climate. — Many facts in regard to New England are already familiar from what has been said in Section I. The sinking of the coast has made the shore line extremely irregular, thus forming many fine harbors. The great glacier from the north has left its traces everywhere. By damming the streams and turning them from their courses, it has caused many lakes (Fig. 16), falls, and rapids. The rocky surface of the country, with bare ledges and boulder-strewn soil, and, indeed, the very soil itself, have also been caused by the glacier. For many years the edge of the ice sheet extended along the southern margin of New England ; and the moraine hills and sandy plains that it piled up now cover much of Cape Cod, Martha's Vineyard, Nantucket Island, and Long Island.

While low near the coast, the land rises rapidly toward the north and west, and soon becomes a plateau crossed by river valleys whose bottoms are several hundred feet below the plateau top. The upland near the coast has been so cut by many valleys that the surface is studded with low hills. But in the west, the higher upland, known as the Berkshire Hills, is quite mountainous.

FIG. 51.

A view across the upland of New England, with Mt. Monadnock rising in the background. Describe this view.

Other mountains, in some cases where the rocks are hard, rise above the plateau. Some of these, like Mt. Monadnock in southern New Hampshire (Fig. 51), rise singly; others, like the White Mountains of New Hampshire (Fig. 52), are in groups; and still others, such as the Green Mountains of Vermont and the continuation of the White Mountains across northern Maine, form irregular ranges. Many of the mountain peaks reach from three thousand to four thousand feet above sea-level; but Mt. Washington in New Hampshire is more than a mile in height, and Mt. Katahdin in Maine (Fig. 64, p. 63) rises to a height of nearly a mile.

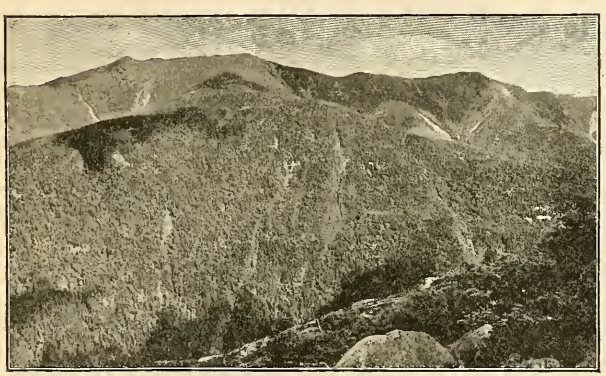


Fig. 52.

The forest-covered slopes of a portion of the White Mountains of New Hampshire.

New England is so far north that its climate is cold in the northern part and the snows are heavy. This coldness is increased by a cold current from the Artic Ocean, known as the Labrador current, which makes the east winds cool in summer, and damp and chilly in winter. On the other hand, since a current of warm water from the Gulf of Mexico, called the Gulf Stream (Fig. 315, p. 280), approaches to within a hundred miles of the coast of southern New England, that section has warm south winds and little snow in winter.

The Forests

Cutting the Timber. — In the days of the early settlers there was so much forest in New England that lumber was one of the first products sent back to England. Now, where the soil is fertile, most of the woods have been cleared away; but large sections in northern Maine, New Hampshire (Fig. 52), and Vermont, as well

as parts of the three southern states, are still covered with timber. Standing on the summit of Mt. Katahdin (Fig. 64), for instance, one sees only a vast wilderness of trees in all directions. The nearest cultivated land is twenty-five miles to the east; but the forests stretch much farther away to the north and west.

Winter is the busy season in this wilderness, for at that time men go into the forests to cut the timber. Lumbering in Maine is an interesting occupation, but it involves so many hardships that a lumberman is said to become an old man after a few years of service.

Fig. 53.

Lumbermen in the Maine woods.

It is often necessary to work when the temperature is far below zero. The swamps, which are numerous, and in summer almost impassable, are then frozen. At that season, also, the snows have levelled over the boulders and fallen trees so that heavy sleds, loaded with logs, may be drawn through the woods.

Usually fifty men or more are necessary to a logging camp. With axes in hand, they go through the woods, cutting all the trees that are large and sound enough for good lumber. These are cut down, the limbs chopped off, and the logs dragged by horses to the banks of the nearest stream. The men go forth early in the morning and work until late in the evening, eating and sleeping in log cabins (Fig. 54). Their beds are broad shelves of rough boards covered with boughs from the spruce and balsam trees, and the camp is often so small that they must lie side by side with scarcely room to turn.

Floating the Logs to the Mills. — When the snow melts in the spring, the cutting is over and another busy season begins. The logs that are ready are whirled away by the stream current, now

swollen by the melting snows; but frequently even this flood of water is not sufficient to carry them. To provide against that difficulty, dams are placed across the streams, or at the outlet of lakes, to store water for use when needed. Immense numbers of logs are floated, or "driven," down stream, forming what the lumbermen call a "log drive."

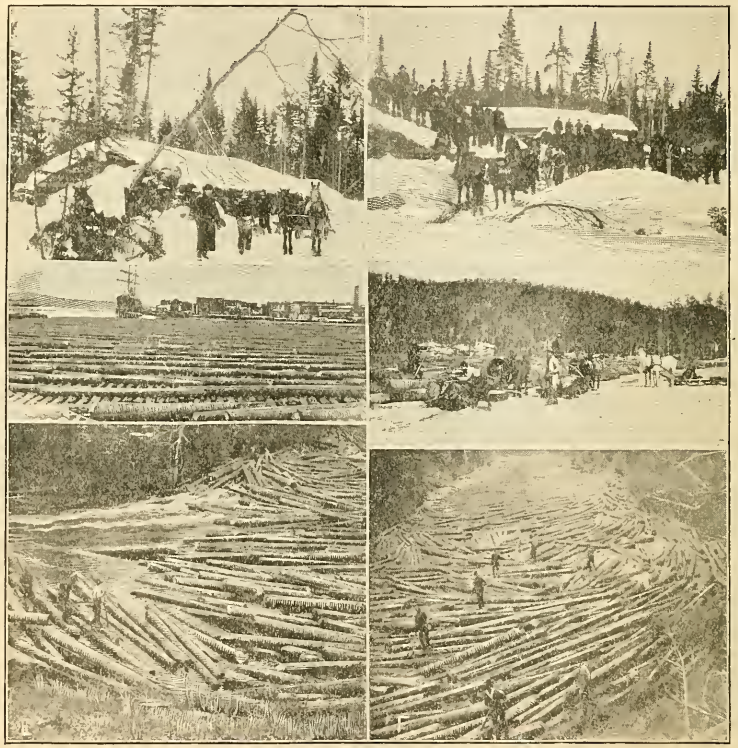


Fig 54.

A group of small pictures to illustrate lumbering. A and B show logging camps; in D logs are being drawn to the frozen stream; E and F are pictures of two log jams; and C shows a vessel loading lumber from the piles of boards on the wharf near the sawmill.

The work of driving the logs down stream is a very exciting one. Rocks and shoals often check them in their course; and, as soon as one gets caught, others are held back by it, so that, if the jam is not speedily

removed, the entire stream may soon become blocked, and all the logs above be prevented from floating down. Such a condition is called a *log jam* (Fig. 54), and it is the business of the men to prevent it by keeping the logs moving along in the river, and by freeing any that may become lodged. To do this, they must often wade into the icy water and ride upon the logs. It is common to see a man glide along on a single log, clinging to it by means of the sharp spikes in his boots, balancing himself with a long pole, and jumping from log to log, as a squirrel springs from tree to tree. The men are often wet from head to foot, and sometimes one is thrown into the water and drowned.

Sawmills and Paper-mills. — Some of the logs are stopped near waterfalls far up stream and there sawed into boards, laths, shingles, etc.; but most of them are carried as far as the current will take them, even down to the river mouths. These places are natural sites for large towns and cities, because there the logs must be changed to lumber and various articles, which requires much work and many men.

Where the current of the Penobscot will carry the logs no farther, that is, where the ocean tide checks the river current, the large city of BANGOR has grown up, since ocean vessels may come to this place to carry off the lumber (Fig. 54). The drives of the Kennebec and Androscoggin are stopped at the sawmills in several cities along those rivers, such as WATERVILLE, and AUGUSTA, the capital; but some are carried down as far as BATH, which is noted for its ship building. On the wharves of PORTLAND, the largest city in Maine, are quantities of boards ready to be shipped away to be made into boxes, barrels, doors, and hundreds of other articles.

Another important use of forest trees is to make paper, for much of the paper commonly seen — as newspaper and wrapping paper — is now made of wood. Short logs (two-foot lengths) after having the bark removed are placed in a steel enclosure and forced against an enormous grindstone. The *pulp* thus ground off is carried away by water, run through a sieve, and compressed into thin sheets between rollers. When dry it is paper ready for the market. One does not often think when reading the news, or wrapping a package, that the paper in his hands may once have been part of a live tree in the forest, perhaps in the woods of Maine.

Paper-mills are found at Waterville, Gardiner, Rumford Falls, Millinockett and other places in Maine. However, Holyoke, the greatest paper-making city in New England, is situated far away from the forests, in the midst of busy cities in Massachusetts. There the pulp is generally made of rags, which produce a finer grade of paper. The neighboring cities guarantee a large supply of the necessary rags.

Among the trees in the forests of northern New England is one kind called the *sugar maple.* It is very common in Vermont, although it grows in many other states also, as in New York, Pennsylvania, and Ohio. Its sap, unlike that of most trees, is sweet; and if one bores a hole through the bark in early spring, when this liquid is moving through the trees most rapidly, it will ooze forth. This is then boiled to drive off some of the water, thus giving maple syrup or maple sugar.

The Rocks

There are three kinds of stone that are especially valuable in New England, namely, granite, marble, and slate, each of which is quarried in large quantities.

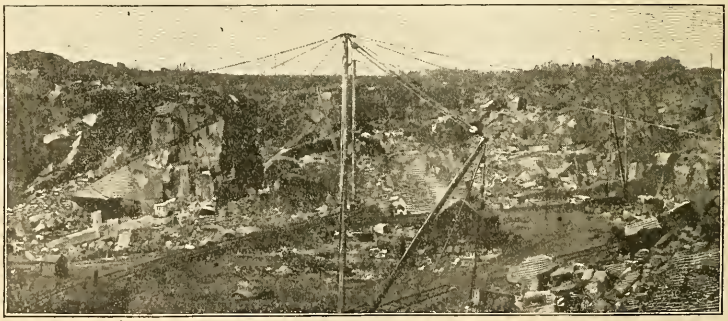


Fig. 55.

A granite quarry near Gloucester, Mass.

Granite. — Many of the hills and even mountains, such as Mts. Washington and Katahdin, are almost solely granite; but this is not often quarried, because it is too difficult to draw the heavy stone from the mountains to places where it is needed. The quarries

have generally been located close to cities, or near the sea where the stone may be cheaply sent away by ship. One of the oldest quarries in the country is at QUINCY, near Boston (Fig. 50), and buildings made of Quincy granite over two hundreds years ago may still be seen in Boston. Other quarries are found in and near GLOUCESTER, Mass., BARRE, Vt., CONCORD, N. H., and along the coast of Maine.

Beds of stone have cracks, called *joints,* extending through them. These aid greatly in quarrying; for, in splitting out large blocks, the quarrymen need only to drill holes, and then, with gunpowder, blast or break the granite from one joint to the next. Smaller pieces are obtained by drilling holes into the large blocks and breaking them apart by driving in wedges.

Much of the granite is used for paving-stones in the city streets, where heavy wagons are constantly passing. For that purpose large blocks are split into halves, these into smaller halves, and so on until the proper size is reached. Other large blocks are loaded into boats at the wharf and carried to Boston, New York, or even as far as New Orleans, where they are used as curbstones, blocks for buildings, and for other purposes. Several of the government buildings at Washington are made of New England granite.

One of the principal uses of granite is for monuments, columns, and other ornamental work. The stone is well suited for this purpose because of its beautiful color, which varies in different quarries, being gray, almost white, bluish, or distinctly red; and it can be easily given a high polish.

Marble. — This stone is so much softer than granite that it may be sawed without being blasted. The most noted marble quarries in the United States are near RUTLAND, Vt., where much of the stone is white, though some of it is streaked with blue. In other places, as in Tennessee, the colors are different and often very beautiful.

Marble is too soft for paving-stones, but is much used for buildings, statues, and monuments, the Rutland marble being one of the most common headstones in the cemeteries of the East. Like granite, it may be given a high polish. Some of the most highly prized marble, mostly obtained from foreign countries, is so banded and

variegated that, when polished, it makes a beautiful ornamental stone for interiors of cathedrals and public buildings.

White marble has been used for many centuries for making fine statues; in fact, long before the time of Christ, the Greeks built the marble Parthenon upon the Acropolis of Athens, and cut marble statues, such as that of the Venus of Melos, which have become famous on account of their marvellous beauty.

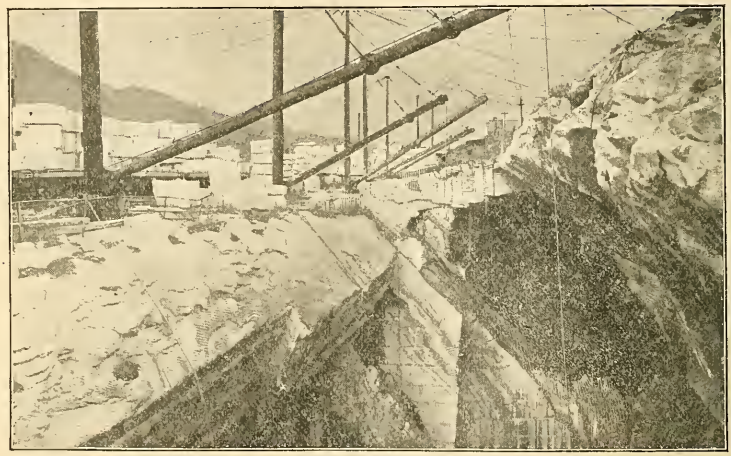


Fig. 56.

A view in one of the marble quarries near Rutland, Vt. Notice the derricks, by the aid of which the heavy blocks are raised out of the deep pits. Some of the large blocks are also seen.

Slate. — Slate rock is quarried in several parts of New England, as in eastern Maine and western Massachusetts and Vermont. It is also obtained in Pennsylvania. The value of slate is due largely to the fact that it splits, or cleaves, so easily that it is readily broken into thin slabs with a smooth surface. In this way it is made into roofing slate and school slates; from it also are made slate pencils, slabs for wash basins, etc.

Fishing

Still another raw product of New England is fish. When the country was first settled, great numbers of various kinds, especially mackerel, halibut, and cod, were found close to the shore. Such

names as Cape Cod, Halibut Point, and Bass Rock, given to places on the coast, indicate this. Find the first of these. PROVINCETOWN, on Cape Cod, is still engaged in the fishing industry.

Fish supplied the first settlers with one of their chief foods, and the fishing industry soon became of importance. You will remember (p. 30) that it was the fishing which first attracted the French to the American coast; and they still retain the right to fish along the Newfoundland shore.

Near the coast, fish are now much less abundant; but since they are still found farther from the shore, hundreds of vessels and thousands of men are engaged solely in catching them. GLOUCESTER, which is a centre for that industry, is the greatest fishing port in the

FIG. 57.

A view in Gloucester harbor, showing the fishing schooners, the wharves where the fish are landed, and the buildings in which they are stored.

United States (Fig. 57); but BOSTON and PORTLAND also have an important fish trade.

Mackerel. — Mackerel are obtained in spring and summer. They swim together, and in such numbers — in *schools*, as fishermen say — that they make a great commotion in the water. The fishermen, who are cruising about in search of the fish, sail in swift, two-masted vessels, called *schooners*. When they sight a "school," they spring into their great seine boats, drop a large *seine*, or net, into the water, and endeavor to draw it around the "school." Then the seine is drawn in, forming a pocket and entrapping the fish. In this pocket enough fish are sometimes obtained to fill hundreds of barrels. Some are sold fresh, others are salted and sold as salt mackerel.

Halibut and Codfish. — The method of fishing described above is similar to that which the Disciples of Christ used in the Sea of Galilee. But fishing for halibut and cod is very different. This is carried on in winter as well as summer, and the vessels go from Gloucester even as far as Greenland and Iceland, although most of them fish on the Fishing Banks off the New England and Newfoundland coasts.

Halibut are very large, often weighing more than a man ; and they are often caught upon single lines. Codfish may be captured in the same manner, though a *trawl* (Fig. 58) is more commonly used for cod than for halibut. The trawl consists of a number of hooks

Fig. 58.

Cod fishing by means of a trawl. Tell what you see in this picture.

hanging from a single long line, all lowered into the water together and left there for hours. The fish bite at the bait on the suspended hooks, and in this way many are caught at one time.

This kind of fishing is dangerous because the men must venture out in small, flat-bottomed boats, called *dories,* to take the fish off the trawls. While they are busy a storm may arise, or a heavy fog come up, and prevent their return to the vessel. They are then left in open boats far out upon the ocean. Every year dozens of Gloucester fishermen are lost in this manner.

As in the case of mackerel, codfish are sold either fresh or salt. In order to salt, or *cure* them, they are split open and cleaned, soaked in barrels of brine, and then dried upon the wharf. Sometimes the bones

are removed, the skin stripped off, and the flesh torn into shreds and packed into boxes as boneless cod. Either the salted or boneless cod may be seen in almost any grocery, and much of it comes from Gloucester.

Other Ocean Foods. — Traps, or *weirs* (Fig. 59), are also set for fish. They are placed along the shore, and many kinds of fish, such as shad, salmon, and bass, swim into them and are then unable to find their way out. *Lobster* fishing is also carried on, especially on the coast of Maine. A lobster trap, made of wood and weighted with stone, is lowered to the bottom, where the lobster lives, crawling around among the rocks and seaweed. A fish head for bait is inside the trap, and the lobster crawls in to get it; but he is so stupid that he is rarely able to find his way out.

Clams, found along many parts of the New England coast, live buried in the mud flats which are exposed to view at low tide. At such time

FIG. 59.

A fish weir at Bar Harbor, Maine. The large buildings are summer hotels.

boys and men dig these shell fish out, much as a farmer digs potatoes from a hill.

AGRICULTURE

So much of New England is hilly or mountainous, and so strewn with boulders, that farming is not so extensive an industry as in many other parts of the country. By no means all the food that is needed can be raised in this section, much grain and meat having to be brought from the Mississippi Valley. And since the southern portion of New England is thickly dotted with cities, where the people are engaged in other occupations, there is a ready market for whatever food the farmers can supply.

Each farm usually has a small orchard and produces hay and grain which are fed to cattle and horses, or sold near by. All the farmers keep a few hens and sell the chickens and eggs, and some make a

business of raising hens, turkeys, and ducks. One of the occupations of the farmers is *truck farming*, which means that various kinds of vegetables, as tomatoes, sweet corn, potatoes, cucumbers, cabbages,

FIG. 60.

A view on a Massachusetts farm, showing some fine breeds of milch cows.

and celery, are carefully cultivated, and these, together with milk and eggs, are sent to the nearest town to be sold. The farmer often takes them himself and sells them from house to house, thus securing higher prices than if he sold them to a storekeeper. Why?

Strangers travelling through New England, upon seeing the hilly surface and rocky soil, are often puzzled to understand how, from such small farms, the owners can earn enough to build such large houses and barns, to furnish their homes so well, and to have so many books and pictures. But the excellent markets in the cities near at hand afford the explanation.

FIG. 61.

A New England farmhouse and barn.

Where the farms are so far away from the cities that it is impossible to drive to them, the profits are less; but special arrangements are made for the marketing of milk. So much of this is needed in the large cities

that special cars, carrying nothing but cans of milk, are run from far out in the country. Also a great deal of milk is made into butter and cheese sometimes on the farm, but much more commonly at factories, or *creameries,* where the work is done by machinery.

In some parts of New England, where the soil is very poor and no market is near, farming has been so unsuccessful that many farms have been abandoned, orchards are grown up with weeds, and houses and barns are tumbling down. This is especially true in the more hilly parts of New England.

Manufacturing

When the Puritans settled New England it was very expensive to bring from over the sea the articles that they needed. Nevertheless, at first they imported not only furniture and tools, but even wood for the interior of houses and bricks for the walls, fireplaces, and chimneys. Even now, in some of the older New England buildings, one sees doors and rafters that came from across the ocean many generations ago.

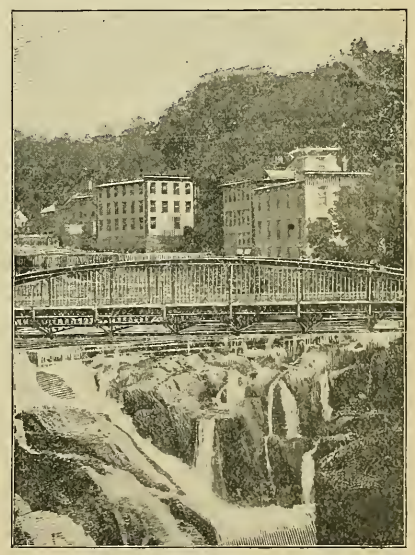


Fig. 62.

A waterfall that supplies power to some factories in one of the smaller manufacturing towns of New England.

Very soon, however, the settlers began to make for themselves such articles as shoes, cloth, and lumber. Thus manufacturing began early in this region, and the industry was greatly aided by the water power, caused by the glacier. It was also aided by the many lakes. These serve as reservoirs from which, even during times of drought, a steady supply of water is secured for the falls and rapids.

Many mills and factories sprang up near the coast, and later in the interior, and thus New England soon became the principal manufacturing section of the whole country. Its many large cities owe

their existence chiefly to this industry. Hundreds of articles are made, those composed of cotton, wool, leather, and metal being the most important.

It may seem strange that this should be the case, since none of these raw materials are extensively produced in New England. But the abundant waterfalls furnished such excellent power that it paid to bring the raw materials there to be manufactured. Therefore, chiefly on account of its water power, manufacturing developed in New England; and the people learned the art so well that factories were later built, even where there was no water power. This is true in BOSTON, for instance, where steam power is used. Nowadays the location of a mill near an important railway, or near some other good shipping point, is a more important matter than its location near water power.

Cotton Manufacturing. — There are about four hundred cotton mills in New England, making such articles as sheets, towels, stockings, underwear, thread, string, handkerchiefs, and gingham and calico dress goods. As many as twelve hundred persons are frequently employed in a single mill, perhaps three-quarters of whom are women, and they may consume from sixty thousand to seventy thousand pounds of cotton per day. Most of the cotton is brought from Texas and other Southern States; but some of it comes from Egypt and other foreign countries.

The cotton arrives in bales, weighing about five hundred pounds each, and is made into cloth by machinery in the following manner: First the dirt, small sticks, etc., are removed. Then the cotton fibres of various lengths are combed out straight and well mixed with one another. After that they are pressed into thin, gauzelike sheets. These are gradually drawn and twisted into threads, and then wound upon spindles and taken to the *looms* for weaving.

Cotton cloths are nothing more than such threads woven together, those that extend lengthwise of the piece being called the *warp*, and those across it, the *woof*. An ordinary piece of calico has a warp of perhaps twelve hundred threads, while a wide piece of cloth, such as a sheet for a bed, may contain as many as twenty-five hundred. Stripes are made by coloring the threads differently, and then, before the weaving begins, by carefully arranging them according to some design.

Wool Manufacturing. — Wool is cut, or *sheared*, from sheep, and much of that which is manufactured into cloth in New England is obtained from Ohio and other states farther west. Large quantities are also imported from Australia.

After being sheared from the sheep, the wool is washed and freed from burs, sticks, etc. Then it is untangled and combed out straight, after which it is twisted into yarn, much as cotton is twisted into thread. The yarn is woven into cloth for men's suits and overcoats, and also for cloaks, skirts, underwear, blankets, stockings, carpets, and dozens of other articles. Most, if not all, of the garments which you are wearing are either made of wool or cotton, or of the two mixed together.

The cities extensively engaged in the manufacture of either cotton or woollen cloth, or both, are, in Maine, BIDDEFORD, LEWISTON, AUBURN, and AUGUSTA, the capital; in New Hampshire, MANCHESTER, NASHUA, and DOVER; in Massachusetts, LOWELL and LAWRENCE on the Merrimac River, PITTSFIELD in western Massachusetts, and FALL RIVER, NEW BEDFORD, and TAUNTON in the southern part; in Rhode Island, PAWTUCKET, WOONSOCKET, and PROVIDENCE (Fig. 50), which is the second city in size in New England. One of the largest cotton factories in the world is at MANCHESTER, N.H.

Leather Manufacturing. — Boot and shoe making is carried on in a number of cities, though the most important are LYNN, HAVERHILL, and BROCKTON in Massachusetts. *Leather* is made from the hides of animals, such as cattle, sheep, goats, horses, and hogs. After the hair is removed, the hides are taken to *tanneries*, where they are soaked in a liquid to make them durable.

Some of the tanneries are situated near forests, as in Michigan, where there are many hemlock trees, whose bark produces the tannic acid for tanning. Others are in the mountains of North Carolina, where a kind of oak grows from which tannic acid is made. Some of the tanneries of New England are also near the forest; but many, as those at SALEM, near Lynn, are so far away that the bark, as well as the hides, must be brought a long distance to them.

In other tanneries, chemicals are used in place of the tannic acid from hemlock or oak bark. In a single tannery near Boston, where sheep skins are tanned, from thirty thousand to forty thousand skins are used each week.

After being thus prepared, the leather is brought to the factories and cut up (Fig. 63), one machine cutting out soles of a certain size, a second tops, a third tongues, etc.; these parts are then sewed or nailed together, and the shoes are soon finished. As in the case of cotton and wool manufacturing, nearly all the work is done by machinery, each person caring for one or more machines and performing the same simple task day after day.

Besides boots and shoes, leather is made into many other articles, as book bindings, harnesses, pocket-books, and bicycle saddles. Can you not name some others?

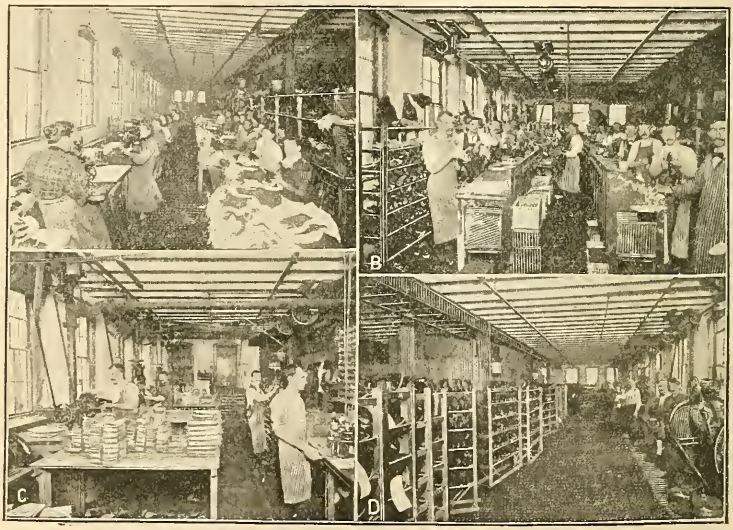


Fig. 63.

Some small pictures of a shoe factory, showing the men and women at work making shoes. Tell what you see in each.

Metal Manufacturing. — On account of the water power, New England early became engaged in manufacturing metals into various articles; and, although steam now largely takes the place of water, these industries are still very extensive, especially in the three southern states. Since almost no coal and iron are produced in that section, these two materials must be shipped from other states.

Therefore, large, heavy objects that require much metal and coal are not usually made.

The lighter articles, as jewelry, clocks, needles, cutlery, tools, and firearms, that require a high degree of skill, are the chief articles manufactured from metal in New England. For instance, WORCESTER (Fig. 50), near Boston, is noted for its manufacture of wire and iron goods, besides envelopes, boots, and shoes; PROVIDENCE manufactures great quantities of jewelry; NEW HAVEN is noted for hardware and firearms; BRIDGEPORT manufactures carriages, sewing machines, etc.; HARTFORD, at the head of steamboat navigation on the Connecticut River, and SPRINGFIELD, farther north, in Massachusetts, both produce firearms, cars, and bicycles. FITCHBURG is also engaged in metal manufacturing.

Near Boston, at WALTHAM, the American Watch Company has an immense factory where twenty-one hundred watches are made every day. About twenty-four hundred persons, more than half of whom are women, are employed there, receiving $100,000 a month in wages. Great numbers of clocks and watches are made in WATERBURY, and jewelry and cutlery at MERIDEN, Connecticut; and in hundreds of smaller cities, towns, and villages in New England there are factories and mills of various sorts. Also some of the cities occupied in cotton and woollen manufacturing, such as FALL RIVER, LOWELL, and NEW BEDFORD, are engaged in the manufacture of iron and other metals. In travelling through the southern portion of New England, one sees busy factories at every hand.

LARGEST CITIES AND CHIEF SHIPPING ROUTES

The Large Cities. — All this manufacturing calls for an immense amount of cotton, wool, leather, metals, coal, and food; and most of these products come from outside New England. It is not strange, therefore, that there are many cities on the coast. For instance, PORTLAND (Fig. 50), the largest city in Maine, has an excellent harbor, and is the eastern terminus of the Grand Trunk Railway, which runs through Canada, so that in winter, when the St. Lawrence River is frozen over, it is a shipping point for Canadian goods. NEW HAVEN, the largest city in Connecticut, PROVIDENCE (Fig. 50), the largest in Rhode Island, and BOSTON, the greatest in New England, are all on the seacoast.

The seacoast of New Hampshire is very small, and the largest city, Manchester, engaged in manufacturing, is inland near some falls in the Merrimac River; but on the coast is the important city of Portsmouth. Vermont has *no* seacoast. Its largest city, Burlington, engaged in lumbering and quarrying, is on Lake Champlain.

Boston and Vicinity. — The most important of all the New England cities is Boston, which is fifth in size in the United States. It is itself a great manufacturing centre, being engaged in most of the industries already named, and in making clothing particularly. About it, and but a few miles away, are many large cities and towns in which also are large manufactories (Fig. 50). In addition, these towns serve as places of residence for many of the business men of Boston.

Among these the largest are Cambridge and Somerville (Fig. 50), which are extensively engaged in meat packing, machine manufacturing, printing, and the manufacture of many articles.

Other cities near Boston are represented on Figure 50. Among these are Chelsea and Malden, each of which is engaged in manufacturing rubber goods and other articles. Not far from Boston is Salem, which in the early days was even more important than Boston. Since its harbor is too shallow for the deep ships of the present time, this city has lost much of its commerce, which is now carried on in Boston. Notice in Figure 35 that Salem was one of the large cities in 1790.

The great size of Boston is due largely to its excellent harbor (Fig. 50) and its central location. Many railway lines reach out from the city toward all parts of the country, while numerous steamship lines connect Boston with all important points along the coast, and with foreign countries (Fig. 50).

The port of Boston is second in importance in the United States. Raw materials are sent there in great quantities for distribution among factories, and the finished goods are shipped all over the world. Also much grain and meat for food reach Boston from the West, and from there are distributed among the smaller cities, or shipped to foreign countries. These, in return, send such articles as coffee, tea, and bananas, which are needed in New England.

Boston and vicinity have been important from the beginning of our history. There, at the commencement of the Revolutionary War, occurred

the Boston Tea Party, Paul Revere's ride, and the Battle of Bunker Hill. The vicinity of Boston is also noted for its literary associations. Harvard College, the oldest in the United States, was founded in 1636 at CAMBRIDGE, three miles from Boston. Yale College, at NEW HAVEN, was established sixty-five years later, in 1701. Longfellow, Lowell, Holmes, and Agassiz were professors at Harvard; and Hawthorne, Emerson, Thoreau, and Whittier lived near by. What writings of these men have you read?

FIG. 64.

Katahdin Lake, Maine. Mt. Katahdin rises in the background.

SUMMER RESORTS

New England is so extensively engaged in manufacturing and other forms of business, that immense numbers of people dwell in cities, where, during most of the year, they are closely confined in noisy factories, or in offices and stores. To these, the wooded mountains, the silvery lakes (Fig. 16) and rivers, the green valleys, and the rocky seacoast offer such attractions that each summer tens of thousands run away from town for a week, or even for months, to enjoy their vacations at these places.

They go to the green slopes of the beautiful Berkshire Hills and Green Mountains, or climb about among the rugged peaks of the White Mountains to enjoy the magnificent scenery (Fig. 52). Many plunge into the woods of Maine or northern New Hampshire, to hunt and fish, or to canoe upon the streams and lakes, especially the beautiful Moosehead and Rangely lakes. Others settle down at farmhouses to enjoy the quiet of the country (Figs. 51, 60, and 61).

While great numbers visit the woods, mountains, and country, many go to the seashore to escape the heat and to bathe in the salt water, or to

sail and row. So many go there, in fact, that almost the entire New England coast is dotted with summer cottages and hotels. Thousands visit Bar Harbor on Mt. Desert Island in Maine (Fig. 59), which is therefore a very busy place in summer. Nantucket Island and Martha's Vineyard are similar resorts farther south, while Newport, just west of them, on Narragansett Bay, is noted for its many magnificent summer homes. The smaller seacoast towns and cities also have many summer visitors, and the business of caring for them is the chief occupation of many of the people.

QUESTIONS AND SUGGESTIONS

Review Questions. — (1) What effects have the glacier and the sinking of the coast had upon New England? (2) Describe the surface of the country and name the principal mountain ranges. (3) How do ocean currents influence its climate? (4) Describe lumbering in Maine. (5) To what use is lumber put? (6) What cities are noted for it? (7) How are maple sugar and syrup made in Vermont? (8) State how granite is quarried and what its uses are. (9) State the same about marble and slate. (10) Describe each of the kinds of fishing on the New England coast. (11) Tell about the farming. (12) What led to the early development of manufacturing in New England? (13) What now determines the site of a factory? (14) Describe cotton manufacturing. (15) Wool manufacturing. (16) On the map, locate the cities most extensively engaged in either or both of these. (17) Tell about the tanning of leather. (18) About the manufacture of boots and shoes. (19) Locate the cities most noted for these industries. (20) What can you say about the manufacture of metals? (21) Name and locate the chief cities engaged in it. (22) Give several facts about Boston. (23) What large cities are near it? (24) Where and how do the people take their summer outing? (25) Make a drawing of the New England States, including the chief rivers, cities, and the state boundaries.

Review by States: *Maine* (*Me.*). — (1) Draw the coast line of Maine. (2) What makes it so irregular? (3) Find the principal rivers? (4) What cities are situated on each? (5) Should you expect much fishing along the coast? Why? (6) What reasons can you give why so many people resort to the Maine coast and woods in summer? (7) Describe the lumbering in Maine. (8) What cities are engaged in producing lumber? Why? (9) What stones are quarried in the state? (10) Which is the largest city? How does it compare in size with Boston and Providence? (See Appendix.) (11) What other cities in Maine are mentioned in the text? Find them on the map. (12) Draw an outline map of Maine, locating the principal rivers and lakes, the capital, and the chief cities. Do the same for each of the other states as you study about it.

New Hampshire (*N.H.*). — (13) What large lakes are found in this state? What river? (14) Name the cities on it. (15) For what are they important? (16) Why are there not more cities in northern New Hampshire? (17) What industry should you expect there? (18) Find Mt. Washington; it is the highest peak in New England. (19) Where should you expect to find most farming? (20) How does the largest city in the state compare in size with Portland?

Vermont (*Vt.*). — (21) What large lake on the western boundary? Into what waters does it flow? (22) What river on the eastern boundary? Through what states does it pass? (23) What is the name of the mountains? (24) Lumbering is carried on, as in Maine; into what waters must the lumber be floated? (25) What other Vermont industries are mentioned in the text? (26) There is also farming in the fertile valleys and some manufacturing, as at Brattleboro. Find it. (27) Compare the size of the largest city with that of Manchester, N.H.

Massachusetts (*Mass.*). — (28) Measure the length and width of Massachusetts and compare it with Vermont and Maine. (29) Name the large cities near Boston. (See Fig. 50.) (30) Find Plymouth; for what is it noted? (31) Find the principal cities mentioned in the text and tell where each is located. (32) For what is each important? (33) What advantages do you see in the location of each? (34) Where is the mountainous portion of the state? (35) What effect should you expect the mountains to have upon agriculture? (36) State as clearly as you can the reasons why Boston has grown as it has. (37) Of what importance is Boston to the cities near by? (38) Of what importance are they to Boston?

Rhode Island (*R.I.*). — (39) Measure this and compare its length and width with that of Massachusetts and Maine. It is the smallest state in the Union. (40) What is the name of the bay in this state? What cities are situated on it? (41) What large city is in Rhode Island? (42) Compare its size with Boston and Portland. (43) Should you expect much lumbering in Rhode Island? Why? (44) Farming? Why?

Connecticut (*Conn.* or *Ct.*). — (45) Where are the mountains in this state? (46) Locate each of the cities mentioned in the text. (47) Tell for what each is important. (48) The farms of Connecticut are better than those of Maine. Give reasons for this. (49) There is almost no lumbering in the state. Why? (50) Compare the size of New Haven with that of Boston and Portland. (See Appendix.)

General. — (51) Name the industries of New England. Tell in which states they are carried on. Which industry do you consider to be the most important? (52) Make a list of the ten largest cities (see Appendix) in New England, the states they are in, and the business they are engaged in.

Suggestions. — (1) Read Whittier's Snowbound. (2) Read about lumbering in Chase and Clow's Stories of Industry, Vol. I. (3) Visit a stone-yard, or a place where monuments are made, and collect some specimens from the chips in the yard. (4) Find blocks of granite and marble in buildings. (5) Make drawings of mackerel, cod, and halibut. You will find pictures of them in the dictionary. (6) Make a collection of cotton, wool, leather, and metals for the school. Also make a collection of articles manufactured from them. (7) If cotton is worth $7\frac{1}{2}$ cents per pound, how much would the 70,000 pounds, that one mill uses in a day, be worth? (8) What are the average wages per hour of the hands in the Waltham Watch Factory? The working day there is ten hours long. How many watches are made per minute? Per year? (9) Visit some factory to see how its work is carried on. (10) Find out about the ice industry in Maine.

For References to Books and Articles, see *Teacher's Book*.

VI. MIDDLE ATLANTIC STATES

Physiography. — The Appalachian mountain ranges and plateaus, with their stores of coal and iron, extend across these states from northeast to southwest. Just east of the mountains is a low, hilly plateau of hard rock, called the *Piedmont*[1] *plateau*. This low, hilly region is really a worn-down mountain land like New England ; in fact, it represents the very roots of those mountains which rose above the sea long before the Coal Period (p. 2). The land slopes seaward, and the streams flow in short courses in the same direction.

Nearer the seacoast the country is a low plain of softer rocks, chiefly sands and clays, that were deposited on the sea bottom and then raised to form dry land. These plains, added to the country not many ages ago, are known as the *coastal plains* (Fig. 45).

FIG. 69.

The fall line. Coastal plains dotted, Piedmont and other sections left white. Cities printed in heavy type are located along the fall line.

From New York to Alabama the line of division between the Piedmont plateau and the coastal plains is marked by rapids and low falls near where streams cross it, and it is, therefore, called the *fall line* (Fig. 69). There are rapids and falls at this place because the streams dig more rapidly into the soft layers of the coastal plains than into the harder rocks of the Piedmont plateau.

Since the rapids and falls determine the place where boats passing up stream must stop, and also where there is water power, the earlier settlers located their villages on the fall line, as the Indians had done before them. Note (Fig. 69) how many large cities are on this line. Name them.

[1] Piedmont means foot of mountain.

FIG. 65.

The Erie Canal and other water routes of New York and vicinity.

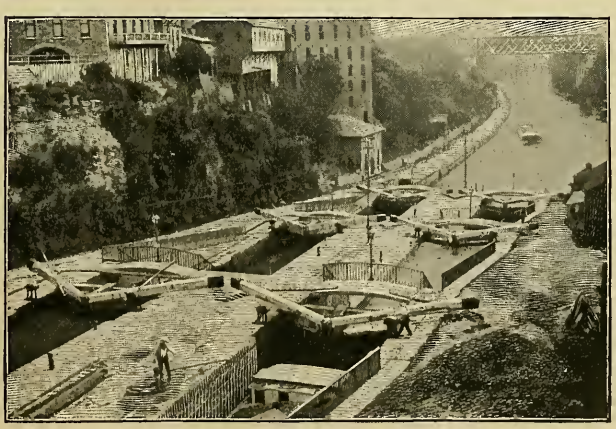


FIG. 66.

The locks in the Erie Canal at Lockport.

MIDDLE ATLANTIC STATES
Scale of Miles.
0 50 100 150
Capitals of Countries: Capitals of States: Other Cities:
Cities with over 1,000,000: New York
Cities with 500,000 to 1,000,000: Baltimore
Cities with 200,000 to 500,000: Buffalo
Cities with 50,000 to 200,000: Allegheny
Cities with 25,000 to 50,000: Roanoke
Smaller Places: Grafton
Capitals with less than 25,000: Dover
82° 80° 78° 76° 74°
46° 44° 42°
DOMINION OF CANADA
QUEBEC
ONTARIO
LAKE HURON
Georgian Bay
LAKE ONTARIO
LAKE ERIE
MICH.
NEW YORK
VERMONT
MASS.
CONN.
Ottawa
Montreal
Ottawa R.
R. St. Lawrence
Richelieu R.
Ogdensburg
Plattsburg
Lake Champlain
Adirondack Mountains
Montpelier
Green Mts.
Kingston
Watertown
Ticonderoga
Lake George
Black R.
Toronto
Oswego
Oneida L.
Rome
Utica
Glens Falls
Saratoga Springs
Gloversville
Mohawk
Amsterdam
Little Falls
Schenectady
Cohoes
Watervliet
Troy
Albany
Catskill
Catskill Mountains
Hudson
Kingston
Poughkeepsie
Hartford
Connecticut R.
Hamilton
Niagara R.
Lockport
Niagara Falls
N. Tonawanda
Buffalo
Rochester
Syracuse
Auburn
Geneva
Seneca L.
Cayuga Lake
Cortland
Ithaca
Hornellsville
Elmira
Binghamton
Dunkirk
Chautauqua L.
Jamestown
Olean
Bradford
Meadville
Erie
London
L. St. Clair
Detroit
Genesee R.
Susq. R.
Wellland Canal
Erie Canal

FIG. 67.

MAP QUESTIONS. — (1) Which states have mountains? (2) Which has none? (3) What influence do you think the mountains have upon the industries? (4) What waters help to form the boundary of this group of states? (5) Find

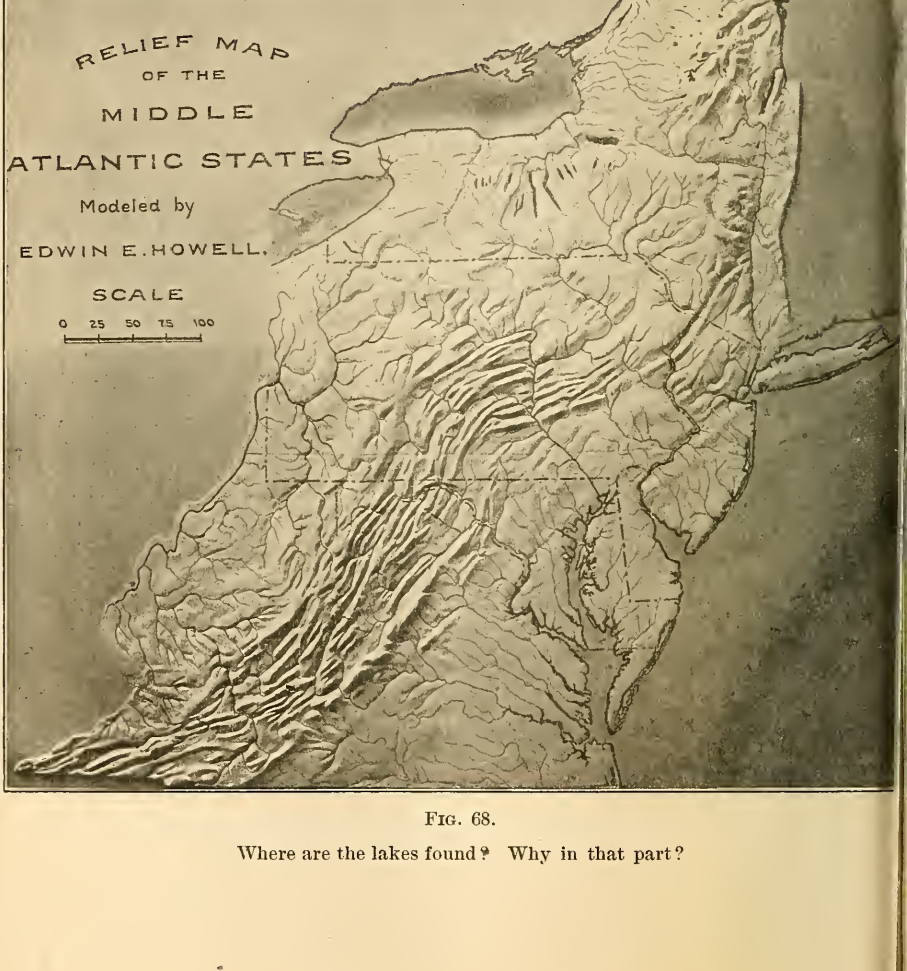


FIG. 68.

Where are the lakes found? Why in that part?

FIG. 70.

The Delaware Water Gap, where the Delaware crosses a mountain ridge.

Although at first the Appalachians acted as a serious barrier to westward migration (p. 33), at the beginning of the last century many emigrants pushed their way across the mountains. This migration was greatly aided by the fact that numerous rivers, such as the Mohawk, Delaware (Fig. 70), Susquehanna, Potomac, and James, flow across a part or the whole of the mountain system. They offered a comparatively easy route across the mountains and therefore formed gateways to the fertile western plains beyond. Trace each of these rivers from its source to its mouth.

On the western side of the Appalachians there is a plateau, sloping gently toward the Ohio and Mississippi rivers, called the Appalachian plateau. Near the mountains, in West Virginia and Pennsylvania, the plateau is so deeply cut by rivers, and therefore so rocky, that it would probably have attracted but few settlers had it not been for the rich coal beds enclosed in its strata. The mining of this coal has been greatly aided by the work of the rivers, which have in many cases cut down to the coal beds and brought the coal to light (Fig. 9).

FIG. 71.

A view of Niagara Falls.

Owing to the fact that the glacier did not spread over the southern part of this group of states (Fig. 11), few lakes and

waterfalls are found there. But they abound in New York and northern New Jersey and Pennsylvania, which the glacier did cover. Indeed, on the boundary of New York is the greatest waterfall in the world — the famous Niagara (Fig. 71). Two of the Great Lakes are also partly in New York, and a number of other large lakes are within its boundaries. Name some of them. See map, Figure 67, opposite page 000.

In the Middle States, as in New England, the sinking of the land has produced numerous large bays and fine harbors, through which the tide often reaches far inland. In the Hudson River, for example, the tide extends above Albany, and in the several branches of the Chesapeake Bay it reaches nearly to the fall line.

Fig. 72.

A New Jersey beach in summer.

Most of the coast is low and sandy, with a gradual descent into the sea, so that bathing is excellent (Fig 72). Because of this fact and the cool sea breezes of summer, the coast is noted for its numerous summer resorts, especially near the large cities.

Climate. — The northern part of New York reaches to the 45th parallel of latitude. How far is that from the equator? From the north pole? How much nearer the equator is the southern part of Virginia? What effect will this have on the crops?

While the climate of the northern portion of this group of states resembles that of New England, the climate of the southern portion is much warmer. Its greater warmth is due partly to the lower latitude, and partly to the ocean currents. The cold Labrador cur-

rent does not extend south of Cape Cod ; but the Gulf Stream passes very near the Virginia coast (Fig. 315).

The climate is so mild in Virginia that sleighing and skating are rarely possible, while places near the entrance of Chesapeake Bay — as Old Point Comfort and Newport News — are important winter resorts. Among the mountains, however, the climate is cooler; and even as far south as Virginia and North Carolina there are cool summer resorts on the mountain sides.

Variable winds supply all of these states with thirty or forty inches of rain per year (Fig. 304), which is sufficient for crops and for dense forests. Because of its climate and products, the region

Fig. 73.

A view in the forest-covered Adirondacks of New York. (Copyrighted, 1889, by S. R. Stoddard, Glens Falls.)

is well fitted to support a dense population ; and next we shall see where the largest numbers of people are collected, and in what occupations they are engaged.

Forests. — Many of the prominent industries in these states are the same as those of New England. For example, there are extensive forests both in the Adirondack and Appalachian mountains, and upon the Appalachian plateau near their western base. In the southern part, as in West Virginia, many hardwood trees are found ; but in the northern portion both the trees and the methods of lumbering resemble those in Maine. Williamsport, in Pennsylvania, is extensively engaged in the lumber business, as Bangor is in Maine. There are also many paper-mills supplied from the forests, as in Watertown near the Adirondacks.

Over most parts of this section the woods have been so wantonly destroyed that it is now necessary to protect those that are left. New York State has established large forest reservations, and founded a College of Forestry at Cornell University in ITHACA. Besides this, some large tracts of woodland, called *game preserves*, are carefully protected by certain citizens for the purpose of fishing and hunting at the proper season. State laws also protect the game.

Fish and Oysters.— Fishing is a much less important industry than in New England. In the bays many *shad* are caught. This fish swims up the bays and rivers each spring in order to lay its eggs in fresh water, where the young remain until they are large enough to venture to the sea.

Oysters are found from Cape Cod to the Rio Grande (Fig. 260, p. 231) ; but one of the best localities for them is Chesapeake Bay, where the waters are warm and quiet. From this region they are collected in great quantities. Some are shipped away fresh in the shell, but many are canned, like fruit. BALTIMORE and NORFOLK are especially noted for this industry.

When young, the oysters swim about freely; but after reaching a certain age, they sink to the bottom, fasten themselves to some solid substance, like a stone or an oyster shell, and never move from that spot. They depend for food upon what is brought to their mouths by the incoming and outflowing tides. Oysters prefer comparatively shallow water and can sometimes be picked up by hand from a boat; but usually they must be dragged or *dredged* up by a long-handled rake. Small steamers and sailing boats are used for gathering them. So profitable is the industry that in many places there are private oyster beds, or "plantations," which are carefully protected.

AGRICULTURE

There is more good farm land in these states than in New England, and therefore agriculture is a more important industry. The low, level, coastal plains, the gently undulating Piedmont plateau, and nearly all of New York State, excepting the Catskill and Adirondack mountains, are dotted with farms. Also in the valleys of the Allegheny plateau, and in the broad valleys between the Appalachian

ridges, there is much farming land. In fact, there were farms in the latter valleys even before there were settlers in the prairie states farther west. The numerous large cities call for quantities of vegetables and small fruit, and so there is much truck farming. Virginia raises many early vegetables for northern markets.

Dairying. — Many farmers turn their attention chiefly to dairying ; and, although butter and cheese are made in every state in the Union, this work is so important in New York that it is described at this point.

FIG. 74.

A dairy herd in New York, on the way to the barn in the evening.

The number of cows in a dairy herd (Fig. 74) varies from a dozen to several score. In summer they are usually allowed to graze in pastures, but during the winter they are fed in large barns. Twice each day they are milked, and the milk may be sent to a neighboring city to be sold by the quart, as in New England (p. 56), or it may be kept for butter. In the latter case it is placed in a rapidly revolving machine, called a *separator,* which separates the cream from the milk. The cream is then churned until butter is made. The skimmed milk, left after the cream is separated, and the buttermilk, left after the butter is made, are generally of little use.

The best cheese is made from fresh milk ; but the process is too difficult to be described here. UTICA, on the Mohawk River, is an important cheese market ; and scattered all over New York are small cheese and butter factories, or *creameries.* These are of great value to the surrounding farmers, since they furnish a ready market for the milk, some of which is brought to the creameries on trains.

Tobacco. — Among the plants which the early explorers found in America was the tobacco. Much to the astonishment of the Europeans, the savages smoked the dried tobacco leaves in pipes. However, the newcomers quickly learned to smoke also, and tobacco soon

became one of the leading products shipped to Europe. Now its use extends throughout the world. So much tobacco is now consumed that, although produced in many countries, tens of thousands of men in the United States alone are employed in raising and preparing it for the market.

Fig. 75.
The tobacco plant.

The climate of most parts of New England and New York is too severe for this plant; but large quantities are raised in the Connecticut Valley, and in the valleys of southern New York, Pennsylvania, and Ohio (Fig. 234, p. 229). However, the state most noted for its production is Virginia. In the vicinity of Lynchburg and Danville, where much tobacco manufacturing is carried on, immense quantities are raised; and Richmond and Petersburg, on the fall line (Fig. 69), are among the great tobacco markets of the world. Find these cities.

The plant, which grows to a height of about three and a half feet, has thick, hairy leaves which are large and broad (Fig. 75), somewhat like those of the pie-plant or rhubarb. The leaves, which are the valuable part of the plant, are plucked in the fall, hung in a room to dry, and then made into some form for use.

Fruits and Vegetables. — Both the fertile soil and the climate of these states are well suited to fruit raising. Nearly every farmer raises some fruit. But the sections near water have the best climate for it, because the water causes the air to be cooler in summer and warmer in winter. One of the most noted fruit belts is the Chautauqua grape belt on the southern shores of Lake Erie in western New York.

Apples form an important fruit crop in New York, being grown in many parts of the state, but especially along the southern shores of Lake Ontario. So much fruit is cultivated in New York that the

nursery business, or that of raising young fruit trees and bushes to sell, is greatly developed. One of the principal centres for this business is ROCHESTER.

On the coastal plain and Piedmont plateau of eastern New Jersey, Delaware, Maryland, and Virginia, grapes, berries, especially strawberries, apples, and other fruits flourish. Aside from fruit, such common vegetables as potatoes, tomatoes, beans, and sweet corn, are raised in all parts of these states.

FIG. 76.

A vineyard in New York.

All of these fruits and vegetables are eaten fresh during the proper season, being used in such quantities that they are sent to the cities on fast trains, and even in special cars. They are prepared for the table in other ways also; for instance, the juice of grapes is made into wine, and that of apples into vinegar.

The *canning* of fruits and vegetables for winter use has become an important industry in several cities, as in BALTIMORE and WILMINGTON. Many farmers are engaged almost entirely in raising fruits and vegetables for this purpose. Probably as many peaches, berries, tomatoes, etc., are put up in cans as are eaten in the fresh state. The tin cans in which they are preserved are to be seen in every grocery store.

Many other crops, such as hay and grain, are raised in the Middle Atlantic States; but a description of these will be given in connection with the states further west, where such crops are produced on a much larger scale (pp. 124-127).

This farming not only supplies *food* to the residents of the cities, but it also furnishes many of them with *occupation*. The marketmen and grocerymen, for instance, receive a profit when they sell vegetables, whether fresh or canned. The workmen in the flour-mills and canneries are also supplied with work by the farmers. Many other factories are established because of farming ; for example, the agricultural implement factory at AUBURN, New York (p. 82). Even much of the lumbering and mining is done because the farmers need furniture, ploughs, etc. Besides this, supplying goods needed by the farmers forms an important part of the business in many cities, like LANCASTER, Pennsylvania, which is in the midst of a rich farming country.

MINING

The products from underground are far more important in these states than in New England.

Salt. — One of these is salt, a mineral which every person must have. In the early days salt springs were discovered at the point where SYRACUSE stands, and that city owed its early growth to those springs. Little salt is now produced there; but immense quantities of soda are made of brine obtained from the beds of salt near by.

These beds of salt were deposited in the ancient sea which covered this region before the Coal Period, and were then buried beneath layers of rock. They lie deep down in the earth in the region south of Syracuse and Rochester, and from them salt is obtained at a number of places. In fact, New York produces more salt than any other state.

When in the earth, salt is hard, somewhat like coal, and must be obtained in one of two ways. In one case a small hole is bored to it and water allowed to run down and dissolve it; then the brine is pumped up and the water is evaporated by heat until only the salt is left. In the other case, a deep hole, or *shaft*, large enough for men to pass up and down, is dug down to the salt; then lumps of salt are broken off and hoisted to the surface. A salt mine is a beautiful sight with its clear, crystal-white walls and clean floor.

Coal. — Although there is little water power south of the region formerly covered by the glacier, there is coal — an excellent substitute. The coal swamps that existed millions of years ago (p. 3) stretched westward from the ancient Appalachian Mountains beyond the Mis-

sissippi River. In some places the coal has been entirely washed away. In others, it is sometimes found close to the surface and sometimes several hundred feet beneath it. Most of this is soft or *bituminous* coal, which is mined in enormous quantities in the neighborhood of PITTSBURG and ALLEGHENY.

When the plains and plateaus that contain the coal beds were raised above the sea, they were nearly everywhere lifted without much folding. This was the case in western Pennsylvania, Ohio, Indiana, and Illinois; but mountains were formed in central Pennsylvania, and there the rocks, including the coal beds, were folded. During the long ages that these mountains have been exposed to the weather, the mountain tops have been greatly lowered. Also rivers have carved out deep valleys, and thus most of the coal in that section has been washed away and carried to the sea. In two or three places, however, as near WILKES BARRE and SCRANTON, beds of hard, or *anthracite*, coal remain. It is to this coal that these cities owe their importance. In that mountain region the coal beds were so deeply folded that neither the weather nor the rivers have been able to remove them; and they remain, therefore, as remnants of much larger beds, preserved because of their protected position.

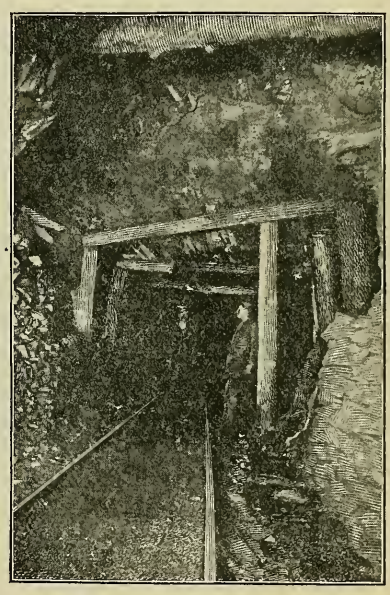


FIG. 77.
A view in a coal mine in Pennsylvania.

Anthracite coal was first made in the same way as soft coal. Had it not been subjected to the pressure caused by the mountain folding, it would doubtless have formed a bituminous coal; but the pressure has changed it by driving off the gases that form a part of all woody matter. These changes have made the coal harder and more difficult to burn; but since it gives forth a more intense heat than bituminous coal, it is pre-

ferred for some purposes, such as heating and cooking. Throughout New England and many parts of the Middle Atlantic States, anthracite is the only coal used for these purposes.

Most of the anthracite beds lie far below the surface, and deep *shafts* have to be sunk to reach them. From the sides of such a shaft, *tunnels* (Fig. 77) are dug into the beds, and from these the coal is removed. Usually there are several beds of coal, with thick layers of rock between them, and the shaft extends downward through them all, with tunnels reaching out from it at each level of the mineral (Fig. 78). In a large mine one may travel for days through miles and miles of dark tunnels.

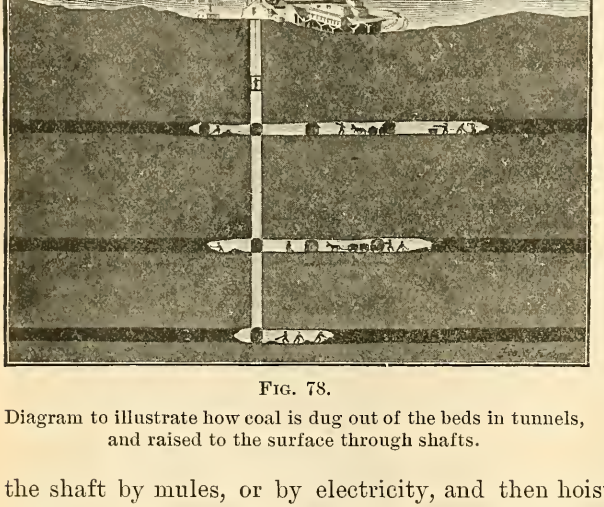


FIG. 78.

Diagram to illustrate how coal is dug out of the beds in tunnels, and raised to the surface through shafts.

The workmen break the coal with the aid of steam drills and picks, and they often furnish their own light by means of lamps fastened to their caps. After the coal is broken loose, it is placed in small cars, drawn to the shaft by mules, or by electricity, and then hoisted to the surface by steam. The mules are kept underground for months, being fed and allowed to sleep in stables cut out of solid coal.

In the early days the coal mining was carried on by Americans, and many are still employed at it. Now, however, foreigners are extensively employed in various branches of the work, and in a coal mine one may hear many different languages spoken. There are so many of these workmen needed that they form regular colonies, living near the mines in houses which they rent from the coal companies.

Oil and Gas. — In the plateau along the northwestern border of the Appalachian Mountains, two fuels, oil and gas, are found. *Petroleum*, as the oil is generally called, means "rock oil," a name which suggests its origin.

Ages ago, when these layers of rock were being deposited on the ocean floor, countless numbers of animals and plants, dying and dropping to the bottom, were imprisoned and deeply buried. These plant and animal fossils then slowly decayed, forming oil and gas. Later, the oil and gas were stored in the earth in the pores between the grains of sandstone and other rocks. Very nearly the same kind of oil is now manufactured from fish refuse, and nearly the same kind of gas rises from plants that are decaying in swampy places.

As soon as an opening is made through the rock by boring into it, the gas, which is associated with petroleum, rushes forth, and is conducted away in pipes, often to distant places. Thousands of homes in BUFFALO, PITTSBURG, and other places are heated with natural gas; and in many factories, too, the gas is used for fuel.

Petroleum also flows out from the borings or *oil wells;* but frequently it must be pumped out. Near the oil wells cities have grown up, such as BRADFORD and OIL CITY in Pennsylvania, and OLEAN in New York. After being taken from the earth, the petroleum is stored in large tanks and then refined (Fig. 79). In its natural state it is a thick, dark yellow or reddish yellow fluid; but in the refinery it is changed so that the greater part of it becomes clear, colorless, *kerosene* oil. Benzine, naphtha, and gasoline are also made from it. The thick substances left after the refining, are used in making dyes of various kinds, machine oil, vaseline, and paraffin. One important use for the latter is in the manufacture of chewing gum.

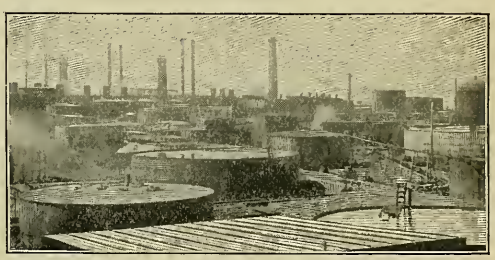


FIG. 79.

Oil tanks in an oil refinery.

No region in the world furnishes so much oil as western Pennsylvania, West Virginia, and eastern Ohio. The only section of the world that approaches it is in Russia near the Caspian Sea. The oil business, which is one of the great industries of the country, is in the hands of the Standard Oil Company, which has absorbed a large number of the small dealers. From the wells the oil is led to the refineries in pipes many miles long, and

the company owns immense numbers of special tank cars for carrying the kerosene all over the country, and steamers for shipping it to foreign lands. Watch for one of the tank cars and describe it.

Iron Ore. — Pennsylvania and West Virginia enjoy a great advantage in having within their own borders an abundance, not only of coal, but also of oil and gas for fuel. Iron ore is also found in Pennsylvania, Virginia, and other states. Thus both the raw material and the fuel necessary for manufacturing it into useful articles are found almost side by side. Of course the cities of the neighboring states, such as New York and New Jersey, are also able to obtain these materials.

This is very important, since iron is the most valuable metal for manufacturing that exists. Like coal, this iron ore was prepared long ago, though in a very different manner, as follows. Small quantities of iron exist in many minerals and rocks, the red and yellow colors of many soils being due to it. As water slowly seeps through the rocks it dissolves the iron, much as it would dissolve salt or sugar if those substances were there. In some places, where the conditions have been favorable, the water has brought quantities of the iron to one place and there deposited it, forming beds, or *veins* of iron ore, and it is these that are now being mined.

Sometimes the beds lie very deep, and again they are so near the surface that the iron ore is dug out of great open pits, as stone is taken from quarries. In appearance, iron ore is sometimes a hard, black mineral, sometimes a soft, loose, yellowish or reddish brown earth. It is not iron at all, any more than wheat is flour; it is only the iron ore mineral out of which iron may be made by a great deal of work.

Iron and Iron Goods. — It is easy to see that one of the principal industries of this section must be connected with iron. Two materials, *coke* and *limestone*, are used with the iron ore to reduce it to the metal. The coke is made from bituminous coal, and the limestone is obtained in quarries.

To obtain coke, coal is placed in stone or brick furnaces, called *coke ovens* (Fig. 80), built in such a manner that very little air can reach the coal, which is then set on fire. Many of the gases that form a part of coal are thus either burned up or driven out. One of these gases is the same as that which is used for street lights and for illuminating houses. So little air is let into the ovens that not all substances in the coal are burnt. The part left is the very light, porous coke which can then be burned and made to furnish intense heat, if supplied with plenty of air.

In reducing iron ore to iron, more coke is used than ore, so that it is an advantage to have the mines of coal and iron ore near each other. The coke, iron ore, and limestone are all placed together in a high, tower-like structure called a *blast furnace* (Fig. 81), so named because a blast of air is forced through it to produce a strong draft while the coke is burning.

FIG. 80.

Coke ovens, on the right and left, and piles of coke lying about ready to be drawn away on the railway.

Such great heat melts the ore and limestone; and the iron, being heaviest, sinks to the bottom of the fiery-hot liquid. The limestone, and those elements of the ore that are not iron, rise to the surface, forming *slag* — a worthless substance that is drawn off through an opening in the furnace and thrown away. Through a lower opening, the iron is run off into trenches made of sand on a sand floor.

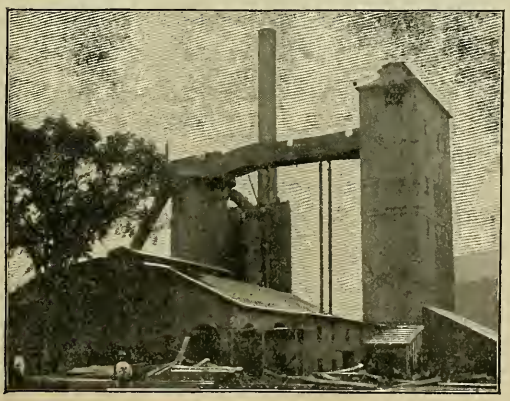


FIG. 81.

A blast furnace. The large round tower on the left is the furnace; the tall slender tower, the chimney; the other, an elevator for hoisting the ore, coal, and lime stone which are placed in the top of the furnace.

There is one main trench with numerous side branches, and each of these has still smaller branches connected with it, as in Figure 82. When the molten iron cools, the little bars of iron, called *pig iron*, are attached to a larger one. These rough bars, which may be easily lifted, are then broken off and shipped away to be made into thousands of different articles.

Some iron goods, such as stoves and the iron parts of your desk, are nothing more than this pig iron melted and cast, in moulds, into the shape that is desired. This is *cast iron*, which is so brittle that it easily breaks under a heavy blow. Other materials, such as knife blades, boiler plates, rails for railways, and watch springs, are made of *steel*. This also is made of pig iron, though after it has been greatly hardened and strengthened by an expensive process.

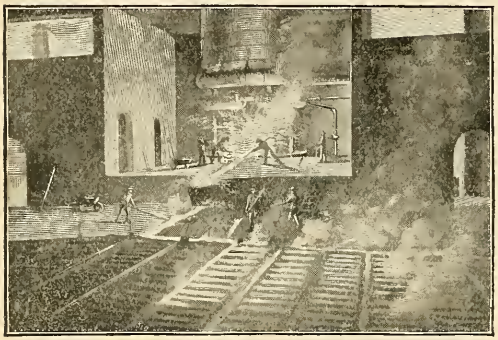


FIG. 82.

Molten iron running out of a blast furnace into trenches, where it cools to form pig iron.

Wrought iron, a third kind, is used where it is necessary for the metal to bend and yet be tough, as in iron wire.

Almost every city in the Middle Atlantic States is engaged in iron work of some kind, some in making iron and steel out of ore, others in manufacturing iron and steel goods. For example, in New York State, BUFFALO manufactures car wheels, machinery, and many other articles. It has nearly four thousand manufactories, many of them making iron goods; and in NEW YORK CITY almost all kinds of iron goods are made. Iron and steel goods, bicycles, etc., are manufactured in SYRACUSE; stoves are made in ALBANY and TROY; and there are iron foundries in BINGHAMTON, ELMIRA, and SCHENECTADY.

In Pennsylvania, PHILADELPHIA manufactures steel ships, cars, and hundreds of other iron goods; PITTSBURG and ALLEGHENY (Fig. 139,) make steel and iron goods of nearly every kind; and SCRANTON, READING, HARRISBURG, ERIE, ALTOONA, and a score of other places have furnaces, foundries, and machine shops for iron manufacturing. In New Jersey, JERSEY CITY, NEWARK, CAMDEN, and HOBOKEN manufacture iron goods; in Delaware, WILMINGTON is noted for its cars and steel ships; in Maryland, BALTIMORE, like Philadelphia and New York, has a great variety of iron manufactures.

WHEELING in West Virginia, and ROANOKE in Virginia, are also engaged in iron manufacturing. Almost any article of iron that you might name is made in these cities.

The importance of even a single manufactory is proved by the following facts: In 1899, at D. M. Osborne Company's works, AUBURN, New York, where farming implements, such as mowers, rakes, reapers, and harrows, are made, over 2700 men are employed, making one complete implement every 40 seconds. Each year these men and their families consume about 9000 barrels of flour, 62,000 bushels of potatoes, 200,000 dozen eggs,

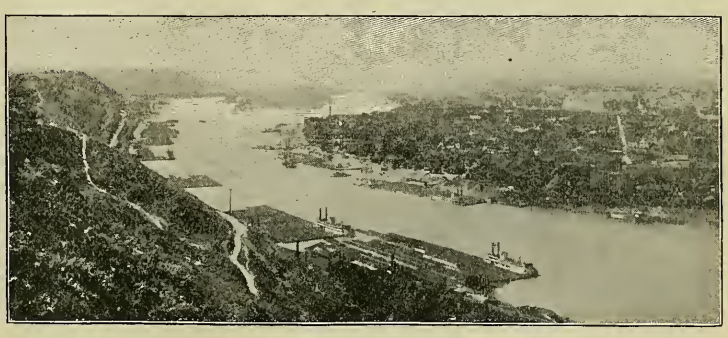


FIG. 83.

Pittsburg, where so much iron manufacturing is carried on.

1,400,000 quarts of milk, 375,000 pounds of butter, and 1,300,000 pounds of meat, besides much coffee, tea, and sugar. Since they also need to buy clothes, shoes, etc., this one factory, by furnishing the money for all these purchases, helps to support farmers, storekeepers, shoe manufactories, railways, and many other industries; but since it is the farmer who buys the implements, it is he who has caused the factory to be needed. One is really dependent upon the other.

Glass, Pottery, Bricks, etc. — Three other mineral products are especially worthy of note. Glass is manufactured at and near PITTSBURG, WHEELING, and many other places, especially where natural gas furnishes cheap fuel. In the vicinity of the former city are sands which, when melted and mixed with other substances, make an excellent quality of glass. PITTSBURG is the greatest centre for plate glass in the country.

In and near TRENTON, New Jersey, there is a kind of clay which may be manufactured into pottery of a very high grade, and pottery making has become an important industry in that city. To make such earthenware the clay is shaped by skilful workmen into cups, saucers, vases, etc. (Fig. 84), and then baked until it is hard.

FIG. 84.

A potter's wheel in the works of the Trenton Potteries Company.

So many bricks are used for building, that brick yards are found in the neighborhood of nearly all cities. Bricks are made of clay, which is pressed into the brick shape when damp, then dried, and finally baked. In this process some of the grains melt, so that, when cooled again, they cling together like stone. The clays near PHILADELPHIA, and the great clay beds of the Hudson valley above NEW YORK CITY, supply an abundance of brick for these great cities.

Many other kinds of manufacturing might be mentioned, as that of flour at ROCHESTER, New York; silk at PATERSON, New Jersey; shirts, collars, and cuffs at TROY; starch at OSWEGO; cotton goods at UTICA; boots and shoes at BINGHAMTON and ROCHESTER; carpets at YONKERS; and plush at JAMESTOWN. There is some manufacturing in nearly every town; and in the large cities so many different kinds flourish that a score of pages would be required even to enumerate them.

LARGEST CITIES AND CHIEF SHIPPING ROUTES

Location of New York City. — The greatest of all the cities of the United States is New York, which contains about three and a half million inhabitants, and is second only to London among the great cities of the world. There are several other large cities in its immediate vicinity, as JERSEY CITY, NEWARK, ELIZABETH, PATERSON, and HOBOKEN (Fig. 91), all across the Hudson River in New Jersey,

but, so far as their business relations are concerned, forming a part of New York City. Before its union with New York, the great city of Brooklyn, on Long Island, was fourth among the cities of the country.

Such a vast collection of people in one section is due chiefly to the excellent harbor and the ease with which goods may be sent westward by water and by rail, making this the principal shipping point in America. More than half of all the foreign trade of the United States is carried on through this port.

The tide reaches up the Hudson above ALBANY, and the Erie Canal extends from there westward to BUFFALO (Fig. 65), on Lake Erie, a distance of 350 miles. From that point one is able to go by way of the lakes to Cleveland, Detroit, Chicago, and Duluth. Thus,

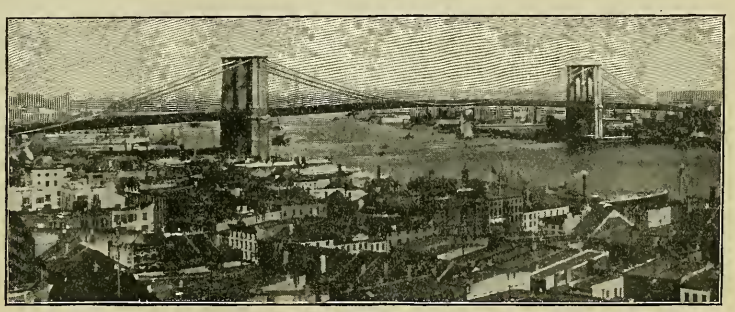


FIG. 85.

Brooklyn Bridge in New York City.

by the aid of this canal, New York City is connected by water with a vast inland territory which is highly productive and thickly populated. By sea New York is connected with different parts of the world, and steamships are constantly entering and leaving its harbor.

Erie Canal. — This canal, which is over 350 miles long, follows the easiest route westward from the Eastern States, the route used by the Indians before the white men came. Since the canal is only seventy feet wide and seven feet deep, all freight coming from the West in lake steamers, and intended for the canal, must be unloaded at BUFFALO, and placed in *canal boats*. These clumsy-looking boats are made with broad, flat bottoms, in order that they may carry

heavy loads without sinking deep into the water. They are drawn by horses or mules that walk along the *tow path* at the side.

Before the Erie Canal was built PHILADELPHIA was larger than NEW YORK, and BUFFALO was only a small village (Fig. 86); but since the canal was completed, in 1825, both the latter cities have grown rapidly, while numerous others along the Hudson River and the canal have attained great importance (Fig. 65). They all have manufacturing industries and use the canal for obtaining such raw materials as coal and iron, and for shipping away the manufactured goods. Notice especially LOCKPORT, situated where there is a very decided slope in the land, necessitating many *locks* (in which the boats are raised or lowered from one level to another) in the canal, hence the name.

FIG. 86.

Buffalo in 1828.

Several other canals have been built in New York, as may be seen in Figure 65; point them out and explain their importance. The smaller lakes and the Hudson River are also made use of as a part of the canal system; but upon these larger bodies of water a number of canal boats are firmly lashed together and taken in tow by a small steamer or tug boat.

Railways of New York. — Canals furnish a very slow method of conveyance; consequently, soon after the use of steam was discovered, men began to build railways. The New York Central Railway, one of the most important in the United States, extends from the very heart of New York City up the Hudson to ALBANY

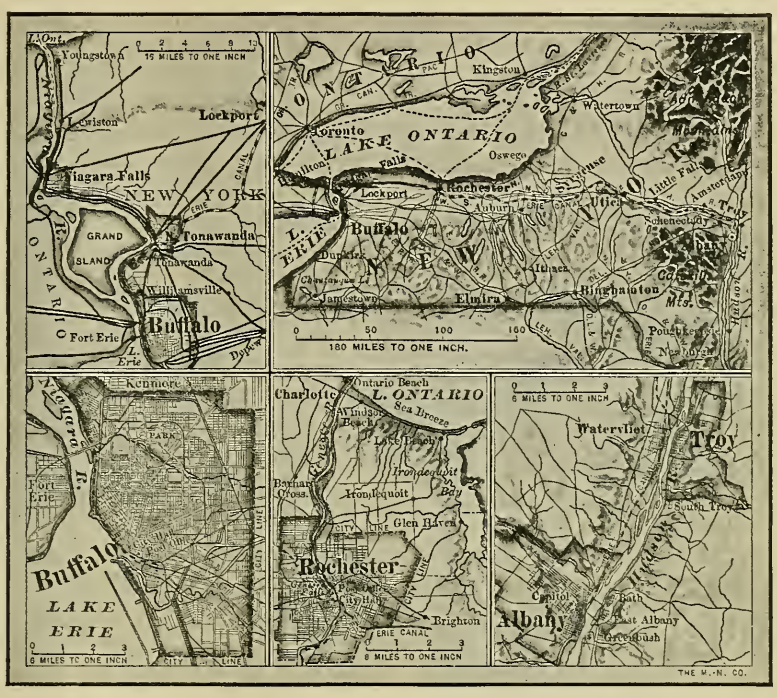


FIG. 87.

Map showing location of Buffalo, Rochester, and Albany.

(Fig. 87), where it connects with Boston trains. From ALBANY westward to BUFFALO the route is almost the same as that of the Erie Canal.

Several other railways connect New York with the West, crossing the Appalachians at various points, and passing through BUFFALO, which is a great railway centre, as well as an important lake port (Fig. 87). At Buffalo immense quantities of grain, flour, lumber, and iron from the West are transferred from lake vessels to canal boats or railways, while coal and manufactured goods are shipped from the East westward.

The Niagara Falls (Fig. 71), about twenty miles away, supply BUFFALO with a great abundance of electric power. All the street cars are run by

it, and many factories besides. Electric cars run by Niagara power, go from Buffalo to Lockport and to the city of Niagara Falls. The latter place has become an important manufacturing city because of the power furnished by the immense Niagara cataract.

Since the Hudson River is about a mile in width at its mouth, most of the railways reaching New York from the West and South cannot *enter* the city. They have their terminus just across the river at Hoboken or Jersey City in New Jersey. Because of this the latter city is one of the great railway centres of the country. From these points passengers and freight are conveyed across the river in *ferries* (Fig. 88), whole trains often being taken upon one boat.

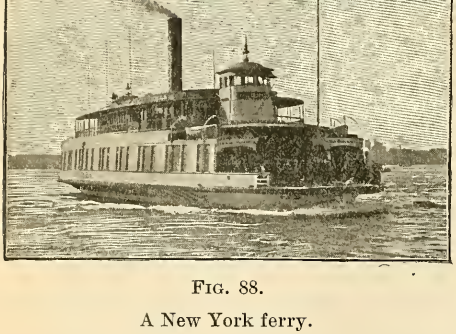


Fig. 88.
A New York ferry.

Since the numerous railways now carry much of the freight that used to be given to the canals, the latter have lost much of their importance, and there is even some talk of abandoning the Erie Canal.

New York City. — New York City is not only the greatest shipping point in North America, but, together with the neighboring cities, the greatest manufacturing centre as well. The place from which goods are most easily shipped in all directions is, for that very reason, one of the best places for manufacturing. Nearly every manufactured article that human beings need is made in or near New York ; but one of the most extensive industries is the manufacture of clothing. Cotton and woollen goods are sent from the New England factories to New York to be made into such articles as dresses, men's suits, and underclothing, and then shipped away. Large buildings, in which hundreds of men and women are employed, are given up to this one work.

Iron and coal are so near at hand that the manufacture of iron goods is another great industry. The refining of petroleum is a third, the oil being led in pipes from the oil fields of western Pennsylvania to great refineries in New Jersey near the metropolis. The

refining of sugar is another immense business in and near New York, as at JERSEY CITY and BROOKLYN; and there are hundreds of other manufacturing industries. More books, magazines, and newspapers are published in New York than in any other city in the Union; and so much wealth is collected there that the New York banks largely control the great business undertakings of all parts of the country.

At the southern end of Manhattan Island, on which much of New York is built, there are about eight square miles of the city given up almost exclusively to the wholesale trade. For the sake of space many of the great office buildings are from eight to twenty-five stories in height. In this part of New York are collected such goods as are manufactured in the city or are brought to it from all parts of the world. Merchants in Denver, Louisville, St. Paul, Galveston, Indianapolis, and other cities, purchase these goods for their stores. In return the Western and Southern people send grain, meat, sugar, etc., to this great city. Thus we daily depend upon one another for our living, even though our homes are far apart.

FIG. 89.

One of the high buildings in lower New York. How many stories has it?

The contrast between life in New York City and upon a farm (p. 120) is striking. On some of the streets scarcely anything but stores can be seen for ten or twelve miles, many of them being small, but some occupying enormous buildings and employing many hundreds of clerks.

Families whose homes are in the city do not usually occupy a whole house; but many live in large buildings, in which hundreds of other people also live. Such a structure, called an apartment building, is commonly from six to eight stories high, and is so arranged that one family occupies only a small part of one floor, or a flat. Other families live above and below, as well as on each side, being separated from

them by only a few inches of brick or boards. Since land is so valuable, sometimes costing scores of dollars a square foot, there is commonly neither front nor back yard. Indeed, excepting where a park happens to be within reach, the street is almost the only place for children to play out of doors. A single apartment house may contain three hundred persons, or more than live in an entire village in many parts of the country.

In the poorer sections of the city the people are even more densely crowded. Some of the children have never seen the country, and scarcely any birds, trees, or grass, excepting possibly in one of the city parks. In these sections, there are many foreigners from all the nations of the earth. There is much poverty among them, and many live in the midst of conditions that can scarcely be described, — filth, vice, and crime of all kinds prevailing.

To escape the necessity of living in crowded city homes, tens of thousands of men have their dwellings in suburban towns or country homes, from ten to forty miles from their places of business. They spend from one to three hours daily travelling back and forth. A part of the time they ride upon elevated railways that are built in the street, two, three, and four stories above the ground, and supported by iron columns (Fig. 90).

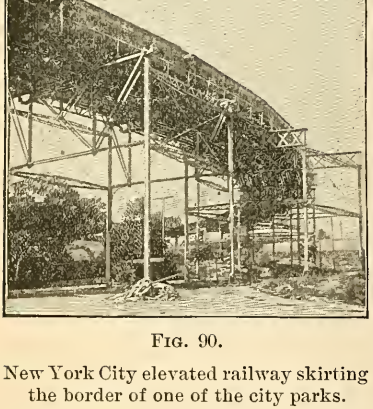


Fig. 90.

New York City elevated railway skirting the border of one of the city parks.

How different all this is from the country, where only two or three houses are to be seen at a time! Where sunlight and fresh air enter one's home from all sides of the building! Where there is plenty of room to play, with green grass, large trees, and singing birds in the yard! No wonder that people living in great cities are anxious to visit the country, the mountains, the lakes, and the seashore, during a few weeks in the summer.

Largely owing to the enormous population of New York City, with its immense manufacturing interests and great wealth, New York is called the Empire State, ranking first in the Union in population, manufacturing, commerce, and wealth (Figs. 234 and 264).

New York State is prominent for its educational institutions also. In New York City is Columbia University; and at Ithaca, on Lake Cayuga,

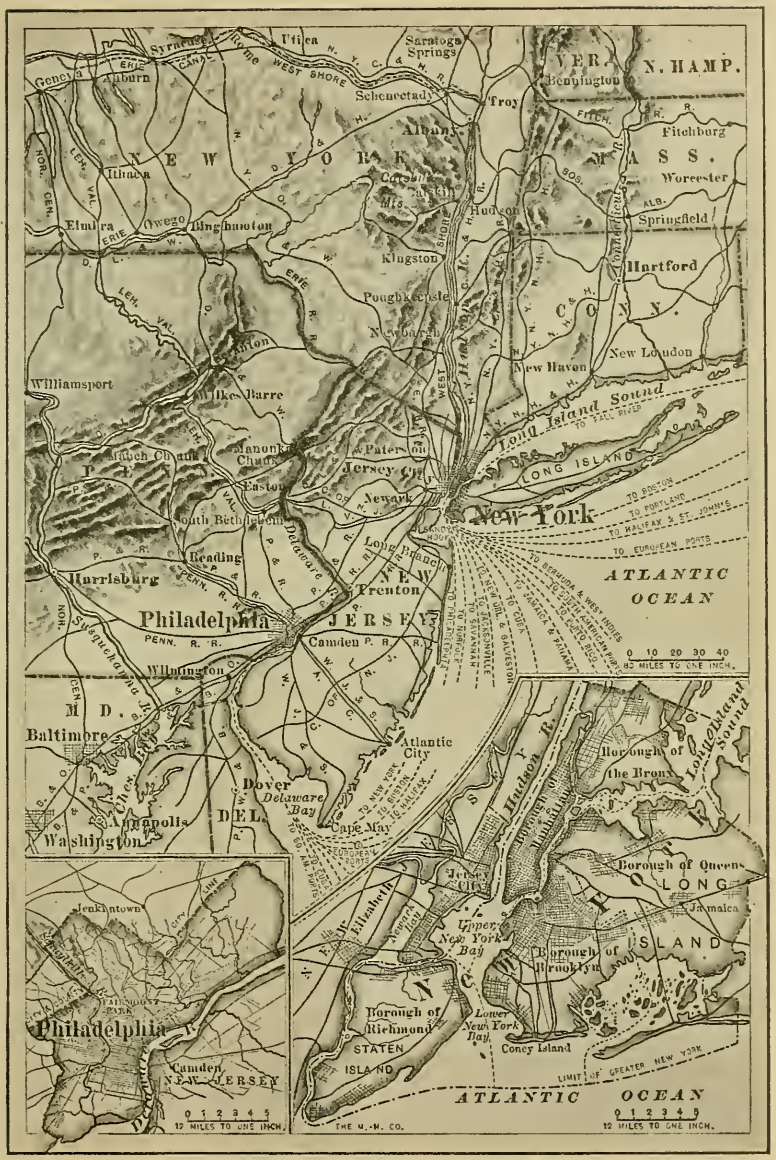


FIG. 91.

Map to show the location of New York City and Philadelphia.

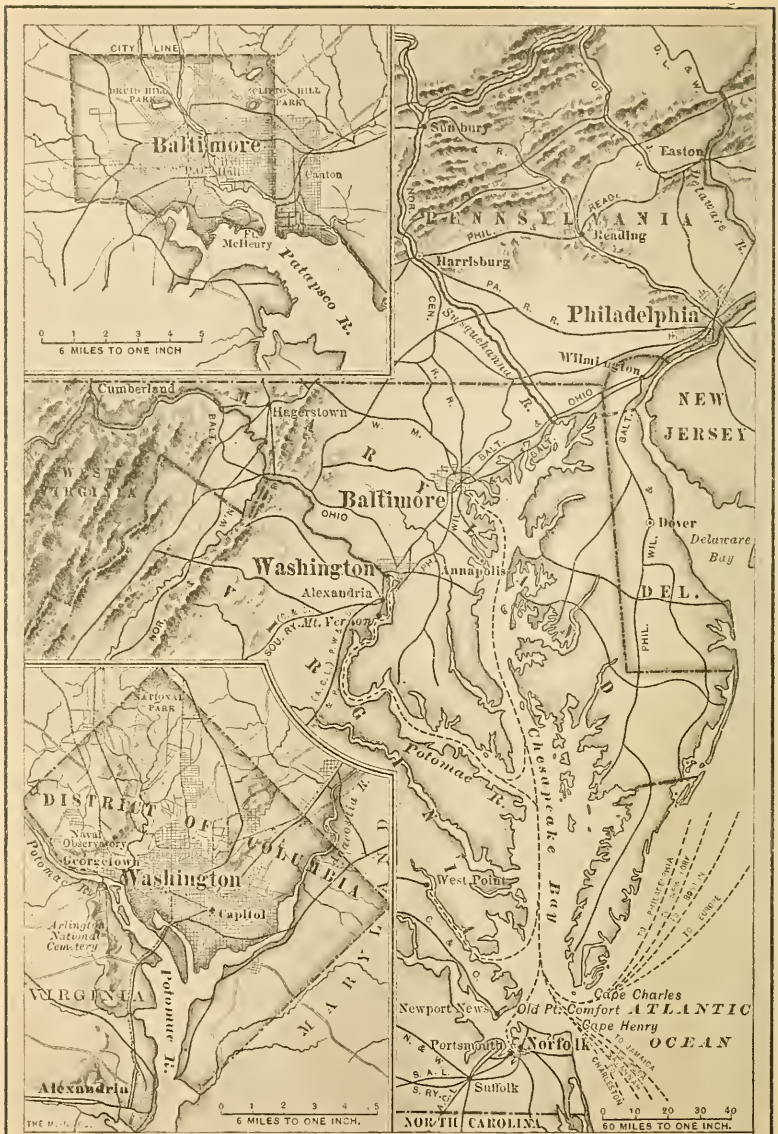


FIG. 92.

Map to show the location of Baltimore and Washington.

in the central part of the state, is Cornell University. Both of these should be associated with Princeton University in New Jersey, and Harvard and Yale universities in New England, as among the most important educational institutions in the country. In Virginia is the very old and well-known University of Virginia. Besides this, north of New York City, on the Hudson River, is West Point, the place where the government school for the training of army officers is located. Also at POUGHKEEPSIE is Vassar, one of the great colleges for women, like Smith and Wellesley in Massachusetts, and Byrn Mawr near Philadelphia.

Philadelphia and its Chief Shipping Routes. — The leading cities southwest of New York are located along the fall line. Name them

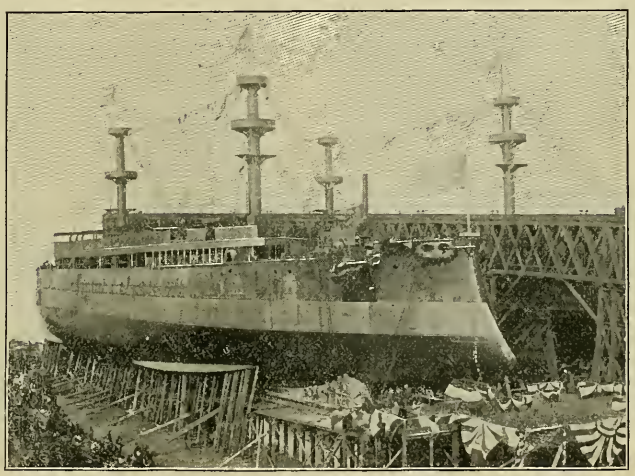


FIG. 93.

One of our great war ships ready to be launched.

as far as Richmond (Fig. 69). The greatest is PHILADELPHIA, which is the third in size in the Union, containing about 1,300,000 inhabitants. As in the case of New York, other important cities are near by, as TRENTON and CAMDEN, New Jersey, CHESTER and NORRISTOWN, Pennsylvania, and WILMINGTON, Delaware. Water deep enough for ocean vessels reaches as far inland as Philadelphia, and its nearness to the coal fields renders it a great shipping point for coal, which is sent to New England and the Southern States.

As in the case of New York, numerous great railway lines enter Philadelphia, connecting it not only with the other cities of Pennsylvania, such as HARRISBURG, the capital, and PITTSBURG, but also with the cities of the North, South, and West. Among these lines are the Pennsylvania Railway, and the Baltimore and Ohio, two of the greatest railways of the country. There are also many steamship lines from Philadelphia (Fig. 91).

A number of canals have been built in Pennsylvania, as in New York; but owing to the mountainous nature of the country, there is no canal connection between Philadelphia and the Great Lakes. Therefore ERIE, the city in Pennsylvania which would most naturally compare with Buffalo, is much smaller; but being near the coal and iron, it is an imporant manufacturing city.

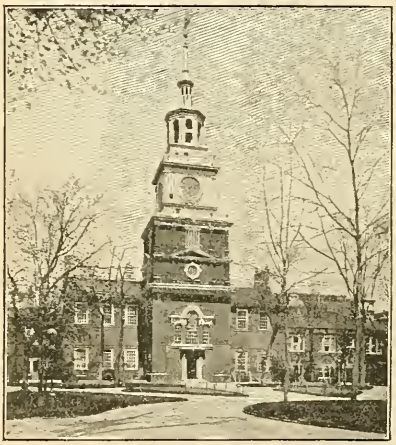


FIG. 94.

Independence Hall, Philadelphia.

Philadelphia and the neighboring city of CAMDEN, being fine shipping points, are also great manufacturing centres. The coal and iron near by lead to the manufacture of cars, heavy machinery, and steel ships (Fig. 93) at PHILADELPHIA and WILMINGTON. Great quantities of clothing are also made in Philadelphia, as in Boston and New York; and in carpet manufacture Philadelphia is the most important city in the country.

Philadelphia is called the Quaker City, having been founded by William Penn and other Quakers, many of whose descendants still live there. It was the home of Benjamin Franklin, and for a number of years, before Washington was built, it was the capital of the United States. Independence Hall is still preserved, in which the Declaration of Independence was made and the Constitution of the United States was drawn up. The leading educational institution there is the University of Pennsylvania.

Baltimore. — At the head of Chesapeake Bay, in Maryland, is the beautiful city of BALTIMORE, the sixth in size in the United States. Since it has a good harbor, and is connected with the West by railways (Fig. 92), and also has access to the coal fields of Pennsylvania and West Virginia, Baltimore has become a noted manufacturing city and shipping port, like Boston, Philadelphia, and New York. Like them, also, it has a multitude of manufacturing interests.

Baltimore is the seat of Johns Hopkins University; and a few miles south, at ANNAPOLIS, is the United States Naval Academy, which prepares officers for the navy, as West Point educates men for the army (p. 90).

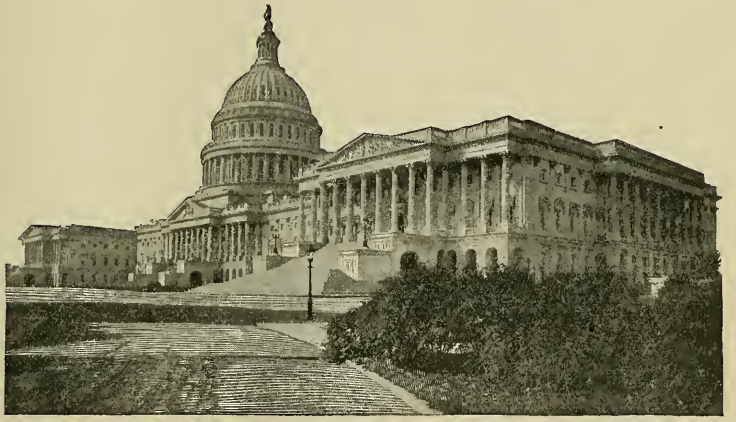


FIG. 95.

The National Capitol, at Washington.

District of Columbia.— Southwest of Baltimore, on the Potomac River, in the District of Columbia, is the city of WASHINGTON, our national capital (Fig. 92). When first set aside, this district was near the centre of the settled part of the country.

Washington is unlike other cities in two respects. In the first place, since there was a certainty that it would one day be very large, it was carefully planned, with wide streets and many parks; and these have since received so much care that this is now one of the most beautiful cities in the world.

In the second place, the inhabitants are not chiefly interested, as in other large cities, in manufacturing and commerce. Here reside the President and his cabinet, members of Congress, foreign ambassadors, and other representatives of the great nations of the world. Besides these there are about twenty thousand men and women engaged in the work of the different departments of the government. The chief buildings, therefore, are not factories and private office buildings, but great government buildings (Fig. 95). Also the topics for conversation pertain rather to the government than to matters of ordinary business.

Richmond and Norfolk. — RICHMOND, the largest city of Virginia, is at the head of tide water on the James River. It is, therefore, an important shipping point, as is also Norfolk on the coast. What other cities are in this vicinity? Name the rivers of the state which cut through some of the Appalachian ranges. It was along one of these routes, through Cumberland Gap, that the early settlers passed to found the states of Kentucky and Tennessee. The water gaps have made it possible for railways to connect the iron and coal mines of Virginia and West Virginia with the coast, so that several of the coast cities are very important shipping points, especially for coal.

But more than half of the inhabitants of Virginia are engaged in agriculture, and farm products are, therefore, important articles for transportation. One of the most fertile farming sections in the country is the limestone valley of the Shenandoah, in which the famous Luray Cave and Natural Bridge are situated. Locate these (Fig. 67). Richmond has already been mentioned as a leading market for tobacco; and Norfolk is a great shipping point for cotton.

QUESTIONS AND SUGGESTIONS

REVIEW QUESTIONS AND TOPICS. — (1) Describe the physiography of these states: — the Appalachian Mountains; the Piedmont plateau; the coastal plains; the fall line and its importance; the effect of the mountain barrier on westward migration; the effect of the glacier; the coast line. (2) Tell about the climate: — its variations, and their effects on crops and seashore resorts. (3) Tell about the forests: — where they are; what woods they contain; cities; forest reserves. (4) What fish are found along the coast? (5) Describe the oyster fishing. (6) What cities are noted for their oyster industry? (7) Where is farming carried on? What kinds? (8) Describe dairying. (9) Describe the tobacco industry:

— the first use of the weed; where raised; at what cities manufactured; the tobacco plant; uses to which it is put. (10) Tell about fruit raising: — where carried on; kinds; uses to which each is put; cities that are greatly benefited by the industry. (11) State how farming and other industries are dependent on one another. (12) Tell about salt: — how formed; where found; how obtained. (13) State what you can about coal: — tell how coal was formed; how the two kinds differ; why some anthracite is left; to what uses it is put; how it is mined; the cities it has helped to locate; how the miners live. (14) Tell the story of petroleum and natural gas: — where found; how obtained; to what uses put. (15) Do the same for iron ore. (16) Describe the process of obtaining pig iron. (17) In what three forms is iron used? Mention some of the articles made of each. (18) Name the principal cities engaged in the iron manufacture. Find each on the map. (19) In what ways are the farmers and the employees of the Osborne factory of use to one another? (20) Tell about each of the other kinds of manufacturing mentioned. (21) For what is each of the cities important? Find each on the map. (22) What large cities are near New York? (23) By what water route are New York and Albany connected? (24) New York and Buffalo? (25) Describe the Erie Canal: — its value; how boats pass over it; the cities it has helped to locate. (26) Why has Buffalo grown so large? (27) Jersey City? (28) Describe New York City: — its location; how it is connected with other sections; the industries; its influence upon other cities; how the people live; how they travel about; how their life differs from life in the country. (29) What universities are mentioned? Where is each? (30) Tell about Philadelphia: — why it has become so large; cities near by; other cities; other facts mentioned. (31) For what is Baltimore noted? (32) What cities near by? (33) What city in District of Columbia? What is the principal occupation of the inhabitants?

Review by States: *New York* (*N.Y.*). — (1) Where are the mountains? (2) What are their names? (3) What are the industries there? Why not agriculture among the mountains? (4) What about the relief of the rest of the state? (5) What effect has that upon agriculture? (6) What waters form parts of the boundary of the state? (7) Into what rivers do the lakes empty? (8) What rivers drain New York? (9) State clearly the importance of the Erie Canal. (10) Which cities mentioned in the text are on the canal or on the Hudson? In what industry is each engaged? (11) What other cities of New York are mentioned? For what is each important? (12) Compare New York in size with all of New England. Remember that the scales of the two maps are different. (13) Draw a map of New York like that of Maine (p. 65). When studying each of the other states, do the same for it.

New Jersey (*N.J.*). — (14) Why should peaches grow better in New Jersey than in New England? (15) Name and locate each of the cities mentioned in the text. For what is each important? (16) Make a list of the five largest cities in New Jersey, and compare them with the five largest in New York. (For their populations, see Appendix.) (17) In what ways are some of the largest cities dependent upon the products of Pennsylvania? (18) Add together the populations of all the large cities near New York (see map, Fig. 67) to see how large it would be if it could include those in New Jersey.

Pennsylvania (*Pa.* or *Penn.*). — (19) Where would you look for the best farm

land? (20) The principal forests? (21) The leading coal mines? (22) Where are the principal cities? Why located where they are? (23) Make a list of the five largest cities, and compare their size with the five largest in New York and New Jersey. (24) Why are there fewer lakes in Pennsylvania than in New York? (25) Should you expect to find fewer waterfalls also? (See p. 11.) (26) Why, then, is manufacturing so important in this state? (27) What kind of manufacturing is especially important? Why? (28) What advantage do you see in the position of Pittsburg and Allegheny at the junction of two rivers? (29) Through what states would one pass in going by boat from Pittsburg to the Gulf? (See map, Fig. 46.) (30) Measure the length and width of Pennsylvania. Also find its area (Appendix). Remember that number, for in many of our maps the outline of Pennsylvania is used to show the comparative size of other sections. (31) Is Pennsylvania larger or smaller than New York? Virginia? New England? (32) Is it larger or smaller than the state you live in? How much?

Delaware (*Del.*). — (33) Which is the principal city in this state? (34) For what is it noted? (35) Why is it especially well situated for that industry? (36) Compare its size with New York, Buffalo, Pittsburg, and Albany. (37) The principal industries of the state are fruit raising and farming. What two reasons can you give why it is well fitted for these? (38) Have you ever eaten any Delaware fruit?

Maryland (*Md.*). — (39) In which section is farming most important? Why? (40) Of what importance are the mountains? (41) Notice how branching Chesapeake Bay is. Why is it so irregular? (42) What influence should you think this would have upon the number of oysters found there? (43) Why is Baltimore favorably situated for receiving coal and iron from Pennsylvania? (44) For canning fruit, vegetables, and oysters? (45) What would be the effect upon the growth of Baltimore if the land should rise again so that Chesapeake Bay disappeared and the Susquehanna flowed through it? (46) Compare the size of Baltimore with Philadelphia, New York, and Boston.

Virginia (*Va.*). — In what other state was the capital the most important city? (47) Describe the tobacco industry. (48) Which cities are engaged in its manufacture? (49) What river separates Virginia from Maryland? (50) What river crosses the middle of Virginia? (51) Compare Richmond in size with Albany. (52) How does Virginia rank in iron production (Fig. 250)?

West Virginia (*W. Va.*). — (53) What disadvantage is it to this state that it has no seacoast? (54) How would we reach the ocean by water from West Virginia? (55) Where is the largest city? Why there? (56) How does it compare in size with Pittsburg? (57) Should you expect to find much forest in this state? (58) Much farming? (59) Coal, iron, petroleum, and natural gas are found there. Of what value are these? (60) What mountain range in the east?

General. — (61) Describe the surface features of this group of states from the relief map (Fig. 68). (62) Describe the differences in climate in the different parts. (63) State the principal industries of the Middle Atlantic States. (64) Make a list of the ten largest cities. Add their populations together, and compare the result with the ten largest in New England. (See Appendix.)

FIG. 96.

Relief map of the Southern States.

FIG. 97.

MAP QUESTIONS. — (1) In what three parts of this section are mountains found? (2) What are the names of the mountains? (3) Which states have no mountains? (4) What are the principal tributaries to the largest river of the section? (5) Th

New England. Why the difference? (8) Why are there so few lakes? (9) The rivers that rise in western Texas — as the Colorado — are often perfectly dry in the western third of their course. Why? (10) Name the states in this group. (11) Find the capi-

FIG. 98.

Map to show location of New Orleans, Memphis, Birmingham, and Atlanta.

VII. SOUTHERN STATES

Physiography. — Almost the entire area included in this group of states is made up of plains. The most level portions are the delta and flood plain of the Mississippi, and the coastal plains, which skirt the entire Gulf and Atlantic coast of the Southern States (Fig. 45). The coastal plains are very level ; and, since the rainfall is heavy, they are often swampy, especially near the rivers. Their higher

Fig. 99.

A peak rising above the forest-covered slopes of the mountains of western North Carolina.

portions are more irregular and better drained ; but, since the soil is sandy, there are large areas which are too barren for agriculture and are therefore still covered by an open pine forest.

West of the coastal plains that border the Atlantic, and separated from them by the fall line (Fig. 69), is the still higher Piedmont plateau, which extends to the base of the Appalachians. The Piedmont section has a good drainage and excellent soil, so that it is the seat of extensive agriculture, especially cotton and tobacco raising. This plateau slopes gradually from the base of the Appalachians, where its elevation is about 1000 feet above sea level, to the fall line where the elevation of the plain is from 100 to 500 feet above the

sea. It is really a region of old mountains worn down to a rolling and, in places, slightly hilly plain.

On Figure 97 it will be seen that the Appalachian Mountains, with their rich coal beds, continue southwestward from Virginia into Alabama. In the Southern States these mountains are generally low, as they are in the Middle Atlantic States; but in western North Carolina (Fig. 99) and eastern Tennessee the mountains are much higher. In fact, the highest peak east of the Mississippi River is Mt. Mitchell in North Carolina. It is 6711 feet in altitude, or 418 feet higher than Mt. Washington in New Hampshire.

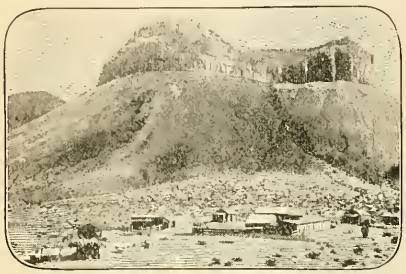


Fig. 100.
A view in the mountainous section of the extreme western part of Texas.

As in Pennsylvania and West Virginia, there is a rough plateau west of the Appalachians. This plateau is deeply cut by river valleys, and is so rugged that it is still covered by extensive forests and has few inhabitants. Still farther west are the broad and fertile plains of the Mississippi Valley and of Texas. These are interrupted by some low mountains in Indian Territory, Arkansas, and Texas.

In western Texas the plains rise until they become high plateaus, reaching an elevation of 4000 to 5000 feet near the base of the spurs spurs of the Rocky Mountains, which extend into Texas (Fig. 100).

The coast line is much more regular than that of New England. As has been stated (p. 14), this part of the continent has been raised instead of lowered. However, after the continental shelf was lifted enough to form the coastal plains, there came a slight sinking, though much less than in New England. This sinking has admitted the ocean waters into the valleys, forming shallow bays and poor harbors. Sand bars, built by waves and tides, have made these harbors even poorer; and each year large sums of money are spent by the government in dredging the sand away from the harbor entrances.

Bars are built, not only opposite the bays, but also where the storm waves break in the shallow water offshore. It is in this way that Capes

Hatteras, Lookout, and Fear have been built, as well as the long chain of bars along the low southern coast. The waves throw the sand up in banks, and the winds pile it still higher, forming sand dunes. These facts partly explain the reason why there are not so many large coast cities in the South as there are along the irregular northern coast.

Still another kind of coast is found in southern Florida, where countless millions of coral polyps live in the warm waters of the Gulf Stream. These have built the limestone rock which forms the southern part of the Florida peninsula (p. 00), and also the many reefs and small islands, or *keys*, which lie just south of Florida.

Climate. — The low plains of the Southern States lie so far south that the climate is everywhere warm; and the damp winds from the Gulf bring an abundant rainfall to them. These conditions make it possible to raise cotton, sugar-cane, and rice, which cannot be grown in the colder Northern States. In southern Florida, semi-tropical and even tropical fruits are easily raised. Among the Florida fruits are oranges, lemons, pineapples (Fig. 101), cocoanuts, and bananas. What is the latitude of southern Florida?

FIG. 101.
The pineapple growing in Florida.

During the cold and disagreeable Northern winter, the Southern weather is mild, like spring and autumn in the North. Flowers are in blossom and birds are singing, many of them having migrated there for the winter. Large numbers of Northern people also go South to spend the winter at such resorts as JACKSONVILLE and ST. AUGUSTINE. The latter, founded in 1565, is one of the early Spanish settlements. One of the important winter industries of the inhabitants is the entertainment of these visitors.

While Northern people travel South in winter to escape the cold, many Southerners go North in summer to escape the heat. Others summer among the high mountains, where the climate is cool, even in midsummer. The best-known mountain resort is ASHEVILLE in North Carolina. In some places, as HOT SPRINGS, Arkansas, there are mineral springs, to which people resort to be cured of certain diseases.

Western Texas has a different climate from the other parts of the South. Being too far from the sea to be reached by damp winds, it receives little rain. The occupations are influenced accordingly. As one travels westward from the Gulf, he passes from the warm, damp coastal plains to a semi-arid country. At first there are dense forests; then come plains with scattered trees, especially the live oak (Fig. 102); beyond these are broad prairies without trees, but with extensive cotton fields. Next a section is reached which is too dry for cotton, and this country, fitted only for ranching, stretches westward for several hundred miles.

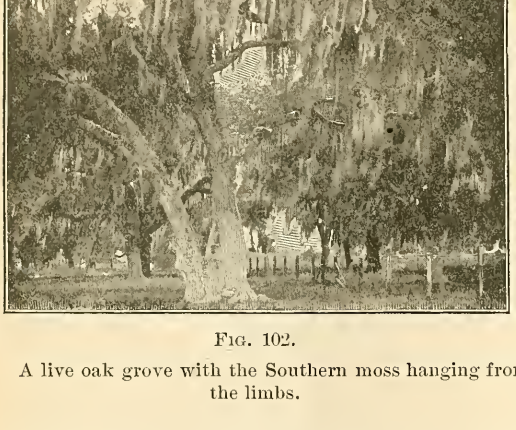


Fig. 102.
A live oak grove with the Southern moss hanging from the limbs.

Forests. — Extensive areas in the Southern States are timber covered, and among the forests are found many trees unknown in the North, some of them, such as the magnolias, bearing large, sweet-scented flowers. There are forests not merely among the mountains, but also on the coastal plains, especially where the soil is sandy (Fig. 103). The method of lumbering is somewhat different from that in New England (p. 46). Instead of floating the logs down to tide water by means of the spring freshets, sawmills are located in the midst of the forests, if possible on the river banks. To them the logs are brought, either by water, by wagon, or by train, and sawed into lumber.

The long-leaved or hard pine, often called the *Georgia pine*, which grows on the sandy coastal plains, is much used for flooring in the North. It is shipped North from the coastal cities of Charleston, South Carolina, Savannah and Brunswick, Georgia, Jacksonville and Pensacola, Florida, and Mobile, Alabama.

While the pine thrives on the low, sandy plains, the hardy oak

and other trees are found upon the plateaus and among the mountains. Quantities of hard wood are shipped from MEMPHIS, Tennessee; but although much of the pine, oak, and other lumber is sent North, a great deal of it is manufactured into doors, blinds, furniture, etc., in the South, as at MACON and MONTGOMERY on the fall line, and at ATLANTA. There is also lumber manufacturing at the coast cities already mentioned, as well as in many other Southern cities.

FIG. 103.
A scene in the pine forest of the Southern coastal plains.

These forests are of value in two other ways. From them are obtained *turpentine* and *tannic acid*, the liquid in which hides are soaked to make leather (p. 30). In the Northern States hemlock bark furnishes a tannic acid which gives the leather a red color, so that shoes made from it need to be blackened; but tannic acid from the chestnut oak of the South gives a lighter or tan color, and it is from such leather that tan shoes are made.

AGRICULTURE

Although farming is carried on in all the states we have thus far studied, other occupations are followed by great numbers of people. Give examples. In the South, however, with its excellent soil and warm climate, agriculture is the principal industry. Indeed, until recently, there was almost no other industry excepting commerce.

While the climate makes it possible to raise crops which cannot be grown in the cooler Northern States, some products are the same as those of the North. For instance, tobacco raising, already described as an industry of great importance in Virginia, is also extensively carried on in Tennessee and North Carolina. DURHAM, in the latter state, is a centre for tobacco manufacturing. Name some Virginia cities engaged in the same industry.

L. of C.

Cotton. — The crop in the South that surpasses every other in value is cotton. The early colonists soon discovered that cotton raising called for little skill, and that a ready market awaited the crop abroad. Their fields were far too large to be cultivated without many laborers, and negro slaves, offered for sale at that time in many parts of the world, were found especially suited to work in the cotton fields. In this way it came about that cotton had much to do with the spread of slavery in the Southern States.

It is owing to the system of slavery that there are now eight million negroes in this country. Among the mountains of North Carolina and other states, where cotton, rice, and sugar-cane cannot

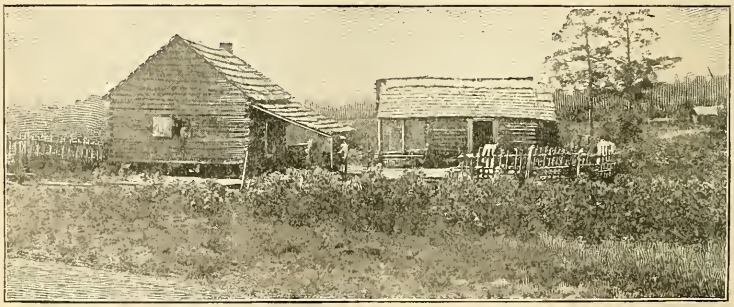


Fig. 104.

Negro homes in the cotton belt.

thrive, and where the farms must be small, there are whole counties where there are almost no negroes; but in portions of some of the Southern States they far outnumber the whites. Most of the negroes still make their living by working in the cotton fields, for cotton is the principal crop all the way from North Carolina to Texas.

In 1898 the Southern States produced about 11,000,000 bales of cotton, each weighing nearly 500 pounds. Of this, about 7,500,000 bales were shipped abroad, especially to England. The remainder was manufactured at home, particularly in New England and the South. In the same year the entire world produced a little over 17,000,000 bales, which makes it clear that the United States furnishes much more than half of all the cotton grown. When we remember that much of our clothing is made of

cotton, it is evident that the Southern States make it their chief work to help clothe the various peoples of the world.

Cotton requires rather fertile soil and a long, warm summer with an abundance of rain. These conditions exist throughout the regions marked as the cotton belt in Figure 241; but, on account of the short summer season, they are wanting in the North.

Cotton seeds are planted in the spring, in rows about three feet apart, and the weeds are kept out until the plants are nearly grown. They reach a height of about three feet, and develop large blossoms that produce a pod, in which the cotton and cotton seed are contained. On maturing, the pod bursts open, revealing a white woolly ball, known as the *cotton boll*, which in appearance resembles the downy substance in the thistle and in the pod of the milkweed.

When a great number of these pods have split open, a cotton plantation of five or six hundred acres presents a beautiful sight, — much like a field flecked with snow (Fig. 105). Then the busy season for the pickers

FIG. 105.

Negroes picking cotton.

begins. As many as two or three hundred negroes — men, women, and children — may assemble in one field, carrying bags and picking cotton, singing melodies, and chattering in the negro dialect the livelong day.

When plucked from the pods, the cotton is attached to seeds, and these must be removed before the cotton can be of use. The seedless cotton is tightly pressed into bales of about five hundred pounds, which are then covered with coarse jute bagging, bound with iron bands, and shipped away to the factories.

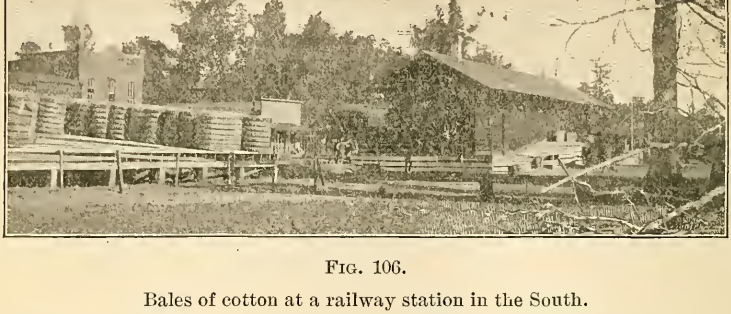


Fig. 106.

Bales of cotton at a railway station in the South.

Rice. — This is one of the most valuable food products of the world, being the main support or millions of people, as the Chinese, for example. Although it is not a staple food in the United States, we do not raise even enough for our own use. Rice requires a warm climate and a damp soil, such as prevail on the low coastal and flood plains from the Carolinas to Texas. Although raised throughout that section, the largest quantity comes from Louisiana.

In the cultivation of rice, after preparing the ground, as for other grains, and planting the seeds, it is usually necessary to flood the fields from ditches. As the plant grows, it forms a slender stalk, upon the top of which appears a head of seed somewhat resembling a head of oats, and commonly reaching a height of from three and a half to six feet. Just before the harvest season the water is drawn off, so that horses may enter the field, and the grain is then cut and the kernels thrashed out, as in the case of wheat. After the hull is removed, the grains are polished at such cities as New Orleans, Savannah, and Charleston, and are then ready for market.

Sugar-cane and Sugar. — There are a number of plants from whose sap sugar is made. One of these, the sugar maple, has already been mentioned (p. 50) ; another is the sugar beet, raised in great quantities in some of the European countries, and also, of late, in many parts of the United States. This beet is a very important source of sugar, because it can be raised in the cool temperate climate. For a long time, however, the principal source of sugar has been the sugar-cane, a plant that looks somewhat like corn.

This plant requires a fertile soil and grows only in warm regions, where there is practically no frost even in winter. For this reason the most cane sugar comes from tropical lands, such as the Hawaiian Islands, the Philippines, Porto Rico, and Cuba (Figs. 243 and 580). In our own country the most noted sugar district is the delta of the Mississippi in Louisiana.

Fig. 107.
A sugar-cane field in Louisiana, with the sugar houses in the background.

In that section there are large sugar plantations, some of them having several thousand acres planted in sugar-cane. Either in the fall or spring, the cane is planted in rows about six feet apart, and a crop is raised every twelve months, being cut in the fall after the middle of October. The stalks grow to be two or more inches in diameter, and reach such a height that a man riding through them on horseback may easily be entirely hidden from view (Fig. 108). As soon as the stalks are cut, they are drawn to the sugar house in wagons, or, on the larger plantations, in railway cars (Fig. 109).

There the cane is ground between rollers in order to squeeze out the juice, which is so acid that it must next be treated with lime. The waste cane, after the juice is pressed out, is used as a fuel to run the engines of

Fig. 108.
Negro women cutting the sugar-cane in Louisiana.

the sugar house (Fig. 107), and the sap is placed in large vats and warmed to evaporate the water. As a result, two products are formed, — a thick black molasses and brown sugar. Some large sugar houses produce as much as fourteen million pounds of sugar a year.

The crude sugar is sent from the sugar house to the refinery, either in New Orleans (Fig. 112), or in the North. At the refinery it is changed to white sugar by a complicated process, as a result of which the various grades of granulated, powdered, and lump sugar are produced. In changing the brown to the white sugar, burned bones, called bone black, are made use of to filter out

Fig. 109.

Loading the sugar-cane on cars to be drawn to the sugar house.

the impurities. The bones are obtained from Chicago and elsewhere, where large numbers of animals are killed for meat.

The molasses is used for various purposes, some of it, especially in the West Indies, being consumed in the manufacture of rum. Molasses is a by-product, like sawdust in a lumber mill, and is not considered of much value by the sugar raiser.

Fruits.— Fruits, such as watermelons, apples, peaches, pears, and grapes, flourish in the warm climate of the Southern States. Florida, however, is so far south that it has fruits of an entirely different kind. There are orange and lemon groves in many parts of the state ; but in the northern part the trees have been greatly injured by frosts. During cold waves (p. 8), cool air from the North sweeps over the Southern States even as far as Florida, sometimes

causing great destruction. Further south, where frosts never appear, are found the more tender tropical plants, such as cocoanuts and pineapples (Fig. 101). The latter grow especially well on the low coral keys, the plant resembling an arid land plant with the pineapple nestled in the midst of sharp-pointed leaves.

Florida and other Southern fruits are sent in great quantities to the Northern States, where they appear in the markets early in the spring. Thousands of bushels at a time are shipped by fast train and steamer. They are sent together with early vegetables, and are intended for hundreds of cities and towns in the North.

Other Crops. — Many other crops besides those thus far named are raised in the South, corn and wheat being among the most important. An immense quantity of corn is produced, and over almost as wide an area as cotton itself; but since corn and wheat are raised so much more extensively in states farther north, they are treated later (pp. 123 and 124).

Peanuts and sweet potatoes are two important products of these states, particularly of North Carolina. Stock of various kinds, as horses, cattle, sheep, and hogs, is also raised, each plantation usually having some of these animals. In the open pine forests of the Florida and Georgia coastal plains, large numbers of cattle are raised.

An important animal in the South, and one which makes a strong draft animal well suited to a warm climate, is the mule. On the fertile plains, especially in Tennessee and Kentucky, much attention is paid to raising mules and fine breeds of horses.

Grazing. — In western Texas, where the rainfall is insufficient for agriculture, grazing is the chief industry. The climate is so dry that the grass cures and becomes hay while still upon the ground, thus offering such excellent food for cattle and sheep that ranching is a thriving business. One may travel for two or three hundred miles westward over the plains, seeing little else than a ranch-house here and there, with an occasional herd of cattle or sheep, and cowboys riding to and fro.

FIG. 110.
Cattle on the Great Plains of the West.

While there is no reason for large cities in this section, and the life of the cowboys and sheep herders is a lonely one, it is their work that helps to supply our tables with meat and to cover our bodies with woollen clothing and with shoes. Explain how hundreds of New England families are dependent for their daily meat upon the products of these distant ranches. Here is a case in which the most densely populated section is intimately related to a very sparsely settled portion of the country.

Mineral Products

Coal and Iron. — Coal and iron ore constitute the principal mineral wealth of the South. These two minerals occur among the mountain ranges all the way from Pennsylvania to the Southern States. They are mined in several places, as near Chattanooga in eastern Tennessee; but the most noted of all is a district at the extreme end of the Appalachian system around Birmingham, Alabama. This region is so rich in these products that it now ranks as the second iron-producing section of the continent.

We learned that Pennsylvania enjoyed a great advantage in having iron ore and coal near together; but in Birmingham even more favorable conditions are found. That city has grown up in the midst of a valley, around the margin of which are found iron ore, coal, and limestone, the three materials necessary for the production of iron and steel. In consequence, this section has become a great manufacturing centre.

Stone. — A large amount of building stone, especially granite and marble, is found in northern Georgia; and near Knoxville, in eastern Tennessee, much marble of different colors is quarried. What city in Vermont is likewise noted for marble? (p. 51.)

Gold and Precious Stones. — In the mountainous portion of western Georgia and North Carolina there is a gold-producing belt which formerly yielded much gold, and from which some is still obtained. Occasionally, too, precious stones, as sapphires and diamonds, are found.

Phosphates. — The soil of farms often becomes worn out and needs a fertilizer. There are various kinds of fertilizers, as manure and bone-dust, which furnish the plant-food needed by crops; but one of the most

important fertilizers is mineral phosphate. This is found in great quantities in Florida and in Charleston harbor. It is a deposit in which are found fossil remains of many animals, such as the teeth of sharks, and the bones and teeth of many large land animals. Among the latter is the huge mastodon, which lived in this country long before white men came. This fertilizer is so valuable that it is shipped to the Northern States from Charleston, Jacksonville, and Tampa, to be used on the farms.

Salt and Oil. — *Salt* is obtained in Louisiana and in Texas; and recent discoveries of vast quantities of *oil* in Texas have made that state one of the most noted oil-producing regions in the world.

Manufacturing

Birmingham, the leading manufacturing centre of the South, is located on an old cotton plantation. In 1880 it had a population of 3086; but it now contains about forty thousand persons. What special advantage has it? In this city, as in Pittsburg and Allegheny, the iron ore is reduced to iron in blast furnaces (p. 79), and then changed to steel and various other useful articles. Several other cities near the mountains are also noted for their iron manufacturing, as Rome and Atlanta, Georgia, and Knoxville and Chattanooga, Tennessee.

Before the war there was very little manufacturing in the South. One reason for this was that water power is not common there, and another that the negroes, who did most of the manual labor, lacked the training necessary to handle machinery. At that time nearly all of the slaves were unable to read or write; but now only about half of the colored people are illiterate. The raw materials were shipped away, and manufactured articles brought back. Thus the cotton went to England, New England, and elsewhere, some of it to be returned in the form of clothes; and the lumber was shipped to various Northern cities to be sent back in the form of furniture. The iron ore was not mined at all.

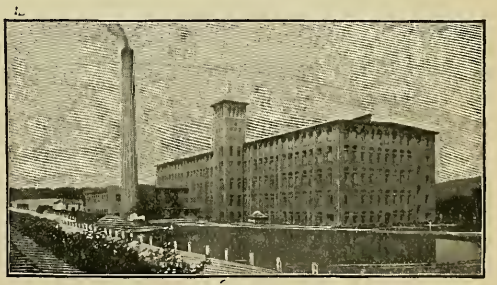


Fig. 111.

A cotton factory at Huntsville, Alabama.

This situation is now fast changing. Since the Civil War the Southerners have become engaged more actively in manufacturing; many Northerners have moved into the South, and the negroes have been advancing. The South has awakened to its great opportunities, and the hum of factories is now heard in many places. The iron industry is already well developed, and each year new cotton mills are being erected.

Some idea of what one of these cotton mills means may be gained from a certain one in Alabama. It employs 600 hands, including men, women, boys, and girls, and pays them about $2000 per week in wages. Each day this mill consumes 15 bales of cotton, averaging about 500 pounds; and since the average yield per acre of land is about 250 pounds, you can easily estimate about how many acres of cotton are called for in one year by this one mill. White people are employed because many employers hold that the negroes lack the intelligence and application necessary for such work. But in some places employers hire the negro.

Texas raises more cotton than any other state, but most of it is still shipped away. In that state, in 1897, there were only four cotton mills, while North Carolina had about 200. Nor is there much cotton manufacturing in Arkansas, Mississippi, and Louisiana.

Formerly the cotton seeds were slowly picked out of the cotton by hand, and then thrown away. Whitney's invention of the Cotton Gin,[1] in 1793, enabled one laborer to separate from the seed as much as 1000 pounds in the time that was formerly required to clean five or six by hand. That, of course, made cotton raising far more profitable, and had an immense influence upon the amount produced, as well as upon the number of slaves needed.

Instead of being thrown away, the cotton seeds are now saved. There are two or three pounds of seeds to one pound of fibre; and since, on the average, one acre produces about 250 pounds of seedless cotton, the quantity of seed from a 600-acre plantation is very large. It was an immense loss when the seeds were thrown away; but now a kind of oil, called *cotton-seed oil,* is extracted from them, which is used in making soap, imitation butter, and a substitute for olive oil. Further than that, the part of the seed that is left after the oil is pressed out, has been found to be an excellent food for cattle and a good fertilizer.

While hundreds of Southern cities and towns now manufacture cotton cloth and cottonseed oil, the most noted are COLUMBIA and

[1] Gin is merely an abbreviation for engine.

GREENVILLE, South Carolina, CHARLOTTE, North Carolina, and AUGUSTA, COLUMBUS, and ATLANTA, Georgia. What cities in New England are likewise noted for cotton manufacture? How do they compare in size with these? (See tables in Appendix.)

Some of the other articles manufactured in the South have already been mentioned, as furniture and other objects from wood (p. 99), tobacco (p. 99), and sugar (p. 104). In each case this work is confined mainly to the section in which the raw material is raised. For example: NEW ORLEANS, in the midst of sugar plantations, has large sugar refineries; MACON, MONTGOMERY, MOBILE, CHATTANOOGA, MEMPHIS, and LITTLE ROCK, all in the neighborhood of forests, produce lumber and furniture; and RALEIGH, DURHAM, and other cities in northern North Carolina manufacture tobacco. Which of the manufacturing cities mentioned are on the fall line? (Fig. 69.)

KEY WEST, on a small coral key, south of the Florida peninsula, is also noted for its tobacco factories. It is so near Cuba that the Havana tobacco, so much prized by cigar smokers, is easily obtained. There is also cigar manufacturing at TAMPA. Why there?

LEADING CITIES AND SHIPPING ROUTES

The *largest* cities so far studied have been located at points on the water where the shipping advantages are superior, and where numerous factories have consequently located. Give examples. For reasons already mentioned, the Southern States have not so many fine harbors as the Northern States (p. 14). Besides that, although many factories have recently been built, the people are still mainly engaged in farming. On these accounts we cannot expect to find so many or so large cities as in the North; and most of those that do exist may be looked for either on the Mississippi River or on the coast.

New Orleans. — The greatest of all Southern cities is NEW ORLEANS, the largest city in eastern United States south of St. Louis. It has a population of nearly 300,000, or more than half as many as Boston, and is therefore the twelfth in size in the United States. When we recall the advantages of New York's water con-

nection with the West, we can readily explain the growth of New Orleans. Pittsburg on the Ohio, St. Paul on the Mississippi, and Kansas City on the Missouri, may all be reached from New Orleans by boat (Fig. 46). How do these distances compare with those from New York to Chicago and to Duluth? Also how far apart are Pittsburg and Kansas City?

New Orleans is situated at the gateway to the most productive valley in North America. The city is located about one hundred miles from the mouth of the Mississippi, at a point to which ocean

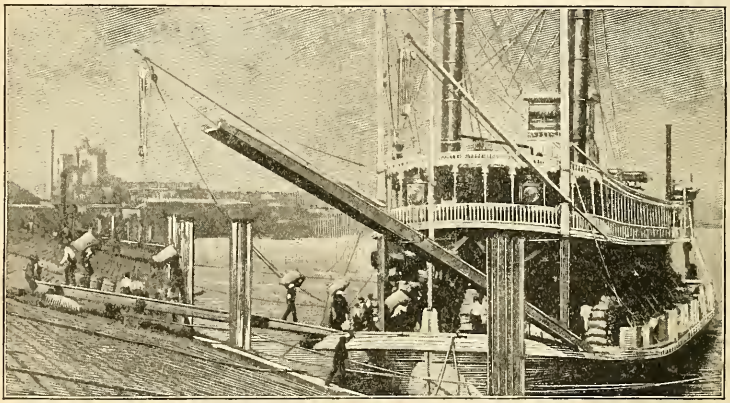


Fig. 112.

Loading a river steamer at the levee in New Orleans. A large sugar refinery is seen in the distance, on the left.

vessels can ascend, although they dare not venture much beyond it. On the map (Fig. 98) you will see that an arm of the sea, called Lake Pontchartrain, reaches up to the city, and that New Orleans is located at the place where the river and lake are nearest together. The stream there makes a bend in the form of a half-circle, which explains the reason for the name of Crescent City, commonly applied to New Orleans.

That particular spot was selected because the sail boats of two centuries ago could reach it by crossing the lake, while without great difficulty they could not sail a hundred miles up the river. The large ocean steamers now in use cannot enter the lake on account

of the shallow water, but must reach the city by the river route. This they can easily do, since they depend upon steam instead of wind.

Much of the land on which New Orleans rests is frequently below the level of the river. In fact, from Memphis southward, the land on either side of the river is nothing but a low flood plain, spreading out for many miles, and often threatened with floods. The mighty river, receiving tributaries from regions thousands of miles apart, is charged with yellow mud, which gradually sinks to the bottom as the current becomes slower toward the mouth. This has built up the bed of the river, so that at high water the floods would spread over the broad flood plains if these were not protected by strong walls of earth, called *levees*. In spite of their strength, these embankments occasionally give way, especially in the springtime, when the snows are melting in the North; then the destruction to life and property is appalling. At such times, hundreds of men patrol the levees night and day to check the slightest leak. Even a hole made by a crawfish may be the beginning of an awful inundation. Why?

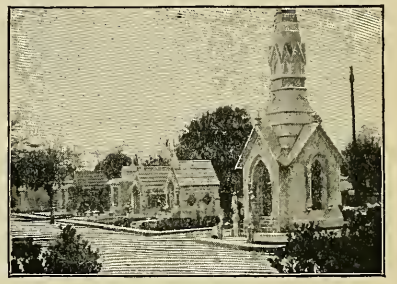


FIG. 113.

A view in a cemetery in New Orleans, where the ground is so wet that the dead must be placed in stone tombs above ground.

Some peculiar consequences result from this condition. The soil on which New Orleans stands is naturally very wet. Indeed, in digging foundations for buildings, water is reached a short distance below the surface. On that account there can be no cellars under the houses, and it is difficult to provide proper drainage.

Since the city once belonged to France (p. 30), French is still a common language there, one person in six being of French stock. About one person in four is colored.

Frost seldom reaches this city, and the midwinter weather is rarely colder than the occasional frosty, early autumn evenings of the North. What must be the effect of this climate upon the style of houses? Also upon the presence of birds, flowers, and fruits in winter.

Knowing the farm products in this region, we have a key to the exports from this point. New Orleans is an important cotton market

and a centre for sugar, molasses, and rice, besides being a shipping point for products from farther up the Mississippi Valley.

Like New York, this city is now connected with the distant interior by rail as well as by water. The Illinois Central Railway extends all the way to Chicago, running parallel to the river for much of the distance; the Louisville and Nashville reaches Louisville and St. Louis; and the Southern Railway runs most of the distance from New Orleans to Washington, connecting with the Southern Pacific, which extends westward, across Texas, to California.

Memphis and Atlanta. — The cities next in size are MEMPHIS and ATLANTA (Fig. 98), each having about one hundred thousand inhabitants. The former is situated in Tennessee, on a bluff where the Mississippi River swings out upon its broad flood plain. Why is that a favorable location? Memphis is one of the great cotton centres and lumber markets of the South.

Atlanta, the "Gate City," is one of the few large cities not located upon a water route. Northeast of it, for over 350 miles, there is no easy pass across the mountains; and until 1880 no railway crossed the mountain ranges in all that distance. Near where Atlanta stands, however, there is a good route; and railways reaching westward from the Carolinas or northern Georgia come together there, making Atlanta a great railway centre. Cotton and tobacco are two of its leading articles of trade, and the iron industry is also important, since the city is not far from the Birmingham iron mines.

Other Cities. — Recalling the rough nature of the plateaus west of the Appalachians, we can see the reason for the location of CHATTANOOGA. It is on the Tennessee River at a point which makes it a gateway in much the same sense as Atlanta. It is on this account that Chattanooga was such an important point during the Civil War, as was Atlanta also.

NASHVILLE, the capital of Tennessee, has saw-mills, furniture factories, and flour-mills. Being in the midst of a splendid farming country, it is a distributing point for supplies to the neighboring towns and farms. It is also one of the educational centres of the South, having Vanderbilt University and other important schools. There are several other well-known universities in the South.

Name the leading coast cities of the Southern States. They are chiefly engaged in shipping cotton and lumber, and most of them are located near the mouths of rivers, so that their goods may be brought to them by water as well as by rail. The two best known are CHARLESTON and SAVANNAH, both noted shipping points even before the Civil War. In Florida is located TAMPA, a port from which steamboats go to Cuba.

Since cotton is raised to be shipped away, there has been need of a large number of small shipping ports along the rivers and coast. Therefore, besides the cities already named, most of which are extensively engaged in cotton shipping, we find the cotton ports of VICKSBURG, NATCHEZ, and BATON ROUGE, on the Mississippi, and SHREVEPORT and LITTLE ROCK on tributaries to that river.

Texas Cities. — This state is the largest in the Union. Find how it compares with New England in size (Fig. 46). The western third of the state, as was stated on page 98, is fitted mainly for grazing, although there is some mining in the mountains. Throughout that entire section there are no cities and almost no large towns, except in the extreme western corner, where EL PASO is situated. The word El Paso means "the pass" in Spanish, for this city is situated at a pass in the Rocky Mountains, through which the Southern Pacific Railway passes westward, while an important line extends southward into Mexico.

East of the arid and semi-arid plateau is the fertile cotton belt. In this there are many cities, such as DALLAS and FORT WORTH — both shipping points, not only for cotton but also for cattle from the Western plains. Dallas is also a busy manufacturing city. AUSTIN, the capital, is a beautiful city on the Colorado River, and SAN ANTONIO is a quaint Mexican town; for Texas once belonged to the Mexicans, but declared its independence in 1836, after which (1845) it was taken into the Union.

FIG. 114.
Scene on an Indian reservation.

Two of the largest cities of Texas are HOUSTON, near the coast, and GALVESTON, the principal seaport west of New Orleans. Immense quantities of cotton and other products are shipped from Galveston. It is also a port of outlet for goods from the Far West.

The Territories. — Many Indian tribes have been given land in what is now called the Indian Territory. There is much mineral wealth in this territory; but, owing to the fact that the Indians own the land, little can be done to develop it at present.

Oklahoma, like Texas, is mainly a great plain, arid in the western part, but in the eastern half a fertile agricultural district. The principal products are corn in the north and cotton in the south. It was formerly a part of the Indian Territory, but in 1890 was opened to settlers. Since then its growth has been so marvellous that almost all the farm land is now occupied and tilled. There are two flourishing cities, — OKLAHOMA and GUTHRIE, — and the territory already has enough inhabitants to warrant its request to be admitted as a state.

QUESTIONS AND SUGGESTIONS

REVIEW QUESTIONS AND TOPICS. — (1) Describe the physiography of these states: — the plains and their products; the mountains; the Texas plains; the coast — its bars, harbors, and coral keys. (2) Tell about the climate: — how it differs from the North; the climate of the mountains; the crops; the winter resorts; the summer resorts; the arid section. (3) How do the forests and methods of lumbering differ from those of Maine? (4) Which cities have important lumber industries? (5) What besides lumber is obtained in the forests? (6) What about tobacco raising in the South? (7) Tell about cotton: — the effect in encouraging slavery; amount produced; where grown; method of planting and picking. (8) Do the same for rice; and tell, also, what it is used for. (9) Describe the sugar industry: — source of sugar; where the sugar-cane grows, and why; method of planting and harvesting; change to sugar, — where done, methods employed, and products obtained. (10) What fruits are raised in the South? Why there? (11) What other crops are important? (12) Where is grazing carried on? Why there? How are we dependent upon these ranchmen? (13) Where are coal and iron found? (14) What great natural advantages has Birmingham? (15) What other mineral products are obtained? (16) Tell about the phosphate. (17) Where is iron manufacturing carried on? (18) Tell about manufacturing in the South: — former condition; present change; importance of a single cotton factory; the cotton gin; uses of cotton seed; cities engaged in cotton manufacturing; cities engaged in other manufacturing. (19) Why are there not so many large cities in the South as in the North? (20) Tell about New Orleans: — the

reason for its importance; why located just where it is; the need of levees; the inhabitants; the climate; the industries. (21) For what are Memphis and Atlanta important? (22) Chattanooga and Nashville? (23) What about the river ports? (24) The seaports? (25) Name the principal cities of Texas and tell for what each is noted. (26) Tell about the two territories.

Review by States: *North Carolina* (*N.C.*). — (1) Which part is mountainous? Name and locate the highest peak in the East. (2) What two plains in this state? (3) Which cities are mentioned in the text? Where is each? For what important? (4) What capes on the coast? (5) What are the industries? (See Figs. 237–259.) (6) Draw an outline map of this state like that of Maine; and later do the same for each of the other states.

Tennessee (*Tenn.*). — (7) Where are the mountains? The plains? (8) Name two cities among the mountains. For what is each important? (9) Answer the same question for two other cities in Tennessee. (10) Which city is the largest? (See table, Appendix.) (11) What large river drains the state? Through what two large tributaries? (12) What industries in this state?

South Carolina (*S.C.*). — (13) Describe the physiography of this state. (14) What are the principal industries? (15) What city is on the fall line? On the seacoast? For what is each important? (16) Which city is largest?

Georgia (*Ga.*). — (17) Where are the mountains? (18) The plains? (19) What are the industries in each section? (20) Trace the fall line across the state (Fig. 69). What cities are on it? (21) Why is Atlanta situated where it is? (22) How does it compare in size with the largest city in the three states just mentioned? (23) How does it compare in size with New Orleans, Boston, Buffalo, and Providence? (24) Name the two seaports. What do they ship?

Florida (*Fla.*). — (25) Why are there so many lakes in Florida? (See p. 15.) (26) What about the relief? (27) What about the climate? How does this influence the crops? (28) What Florida cities were mentioned, and for what is each important? (29) What mineral product comes from Florida? (30) What is the principal industry at Key West? Why?

Alabama (*Ala.*). — (31) Trace the fall line across this state. What cities are situated on it? (32) Where is Mobile? For what is it important? (33) Describe the location and industries of Birmingham. (34) What crops are raised in Alabama? (35) What cities are engaged in manufacturing cotton? (36) In lumber manufacturing? (37) Compare Mobile in size with Atlanta and Birmingham.

Mississippi (*Miss.*). — (38) Why is there no seaport? (39) In what way can the products of the state be shipped by water? (40) From what cities? (41) What are the products? (42) Why no mining? (43) What reasons can you give why there is so little manufacturing?

Louisiana (*La.*). — (44) State the reasons for the great importance of New Orleans. (45) Why has it a better location than Mobile or Charleston? (46) Compare it in size with those cities. (47) With New York, Boston, and Baltimore. (48) What large tributary enters the Mississippi in Louisiana? (49) What crops are raised in Louisiana? Why there? (50) Tell how the delta is caused to grow.

Arkansas (*Ark.*). — (51) What large river enters the Mississippi in this state? (52) There is considerable forest in Arkansas. In what part should you expect to find most of it? (53) Is Arkansas in the cotton belt? (See Fig. 241.) (54) The

capital is the largest city. Compare it in size with Memphis. Why is it less favorably situated than that city? (55) Compare it with New Orleans.

Texas (*Tex.*). — (56) Where are the mountains? (57) Are there forests on the western plains? Why? (58) What are the industries there? (59) What city in the western part? Why there? (60) What are the industries in eastern Texas? (61) What cities are mentioned in the text as being in eastern Texas? (62) For what is Galveston noted? (63) Compare it in size with New Orleans, Charleston, and Boston. (64) How many times larger than Rhode Island is Texas? (For area, see table in Appendix.) Than Pennsylvania? (65) Add together the areas of all the New England and Middle Atlantic States, and compare the total with the area of Texas. (66) Compare the population of Texas with that of Massachusetts (see Appendix). Compare it with that of New York City (see Appendix).

Indian Territory (*I.T.*). — (67) What disadvantages do you see in the fact that this region is owned by the Indians?

Oklahoma (*Ok.*). — (68) What about the climate of the western part? (69) What crops are raised in the eastern part? (70) Into what river does the territory drain? (71) Name and locate the two cities.

General. — (72) Which is the smallest state? (73) Compare it with Pennsylvania and Massachusetts. (74) State the principal industries of the South. (75) Of what advantage is it that they are so different from those of the North? (76) Add together the populations of the ten largest cities, and compare the result with the total for the ten largest in the New England States (see table, Appendix).

Suggestions. — (1) Examine a floor made of Georgia pine. (2) Show several ways in which New England and the Southern States are dependent on each other. (3) What would be the effect on the cotton manufacturing of England if the United States engaged in war with that country? (4) Find what the effect was at the time of the Civil War. (5) Near what places were some of the great battles of the war fought? (6) What other inventions may well be compared with that of the cotton gin in importance? (7) Try raising some rice in the schoolroom. (8) Raise some tobacco, cotton, and sugar-cane. (9) About how much sugar does your family use each year? (10) Find out why the cultivation of rice is unhealthful work. (11) Find out something about Indian Reservations and the methods employed by the United States to improve the condition of the Indians. (12) What reasons can you give for expecting the cotton mills in New England to prove less profitable, now that the South is developing such mills? (13) Find out how much farther it is from New Orleans to London than from New York. What effect should you think its greater distance from Europe would have on the growth of New Orleans? (14) Through what waters would a boat go from New Orleans to Kansas City? To Pittsburg? To Chicago? To San Francisco?

For References, see *Teacher's Book.*

FIG. 115.

Describe the relief of this section.

FIG. 116.

MAP QUESTIONS.—(1) Name the large rivers of this group. Draw a sketch map showing them. (2) Draw a sketch map of the five Great Lakes. (3) Locate upon each of those sketches the cities printed in large type (those over two hundred thousand inhabitants (see Appendix)). (4) Are any of the very large cities not situated on rivers or lakes? Why? (5) What advantages have these cities from their location? (6) Examine Figure 11 to see

r the glacier reached in these states. Do you find any lakes south of that line? at influence must the Great Lakes have upon the summer climate of places near Upon the winter climate? (8) Why is the interior colder in winter and warmer ner than the coast? (9) State some ways in which the Great Lakes must have ed the development of the West.

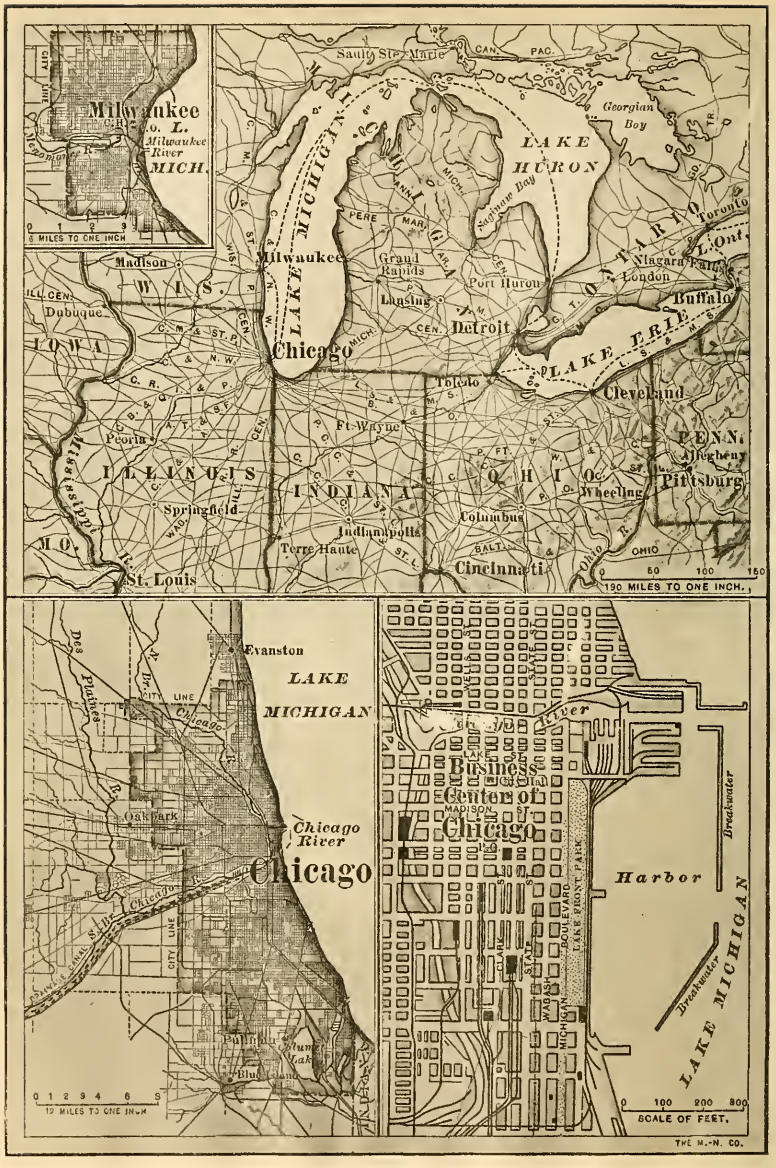


FIG. 117.

Map showing the location of Chicago and Milwaukee.

VIII CENTRAL STATES

Physiography and Climate. — A hundred years ago, when a considerable number of pioneers pushed across the Appalachian Mountains into Ohio and Kentucky, they were gladdened by the sight of immense tracts of level land. For hundreds of miles the plains slope gently toward the Mississippi; and then, beyond that river, they slowly rise again for hundreds of miles to the very base of the Rocky Mountains. In a few places, as in western South Dakota and southern Missouri, low mountains rise above the plains; but most of the country is a vast level tract, quite unlike the hilly and mountainous region farther east. What are the names of the mountains of the Central States? (Fig. 116.)

Not only did the settlers find the land level, but most of it was free from forests and boulders. In many portions of New England weeks of hard labor were required to remove the trees from a single acre, and many days to drag away or bury the boulders. On the broad plains, however, such labor was unnecessary, for there were hundreds of thousands of square miles covered only with grass. These treeless plains became known as the *prairies* (p. 24).

While boulders are abundant in some places, the glacier has in most sections left a deep, rich soil, free from stones. The reason for this is, that here the glacier found softer rocks to grind up into soil than in New England, and was therefore more easily able to reduce them to small fragments. In many sections, as in parts of Illinois, Indiana, and Ohio, the glacial drift is one or two hundred feet deep. It is the deposit of this drift which has caused the thousands of lakes in Minnesota and other states.

The summers are too short for cotton, but they are long and hot enough for numerous other crops. The rainfall is also sufficient for crops, except in the extreme western part, which is arid, like western Texas (p. 98).

Settlement of the Mississippi Valley. — The conditions seemed favorable for agriculture ; and, in spite of danger from Indians, the settlers poured across the gaps in the mountains, following the Great Lakes or the Ohio River and its tributaries. At first only a few ventured in, travelling until they reached a spot which suited their fancy. There they built rude log huts, and settled down to a solitary existence, one family being perhaps miles away from its nearest neighbor.

As more persons came and wished to proceed farther westward, they built flatboats to navigate the rivers, and they settled in groups along the river banks, forming villages which soon grew into towns and cities. Their life was of the simplest kind, each family depending largely upon itself for whatever it needed (First Book, p. 82). Some articles had to be purchased; for though the rich soil produced abundant crops, the pioneers still needed sugar, cotton cloth, tools, and medicines. Since almost all this region drained into the Mississippi, the most accessible place where such supplies could be obtained was New Orleans. Consequently the products of the farm were floated on flatboats to that point, and there sold or exchanged for the articles desired.

A great improvement was made when steam came into use. The first steamboat on these Western rivers was the *New Orleans,* which started out from Pittsburg in 1811. "As it ran down the Ohio, making extraordinary speed in comparison with anything before known, the quiet denizens of the forests along the river banks were amazed and frightened by the strange apparition. Not a few of the more ignorant folk thought the Day of Judgment was at hand, as they watched the showers of sparks and heard the rush of the wheels. And when the craft stopped at Louisville, well along in the night, and let off steam, the roar from the escape-pipes brought a good share of the town tumbling out of their beds to see what was the matter." [1]

Canals, similar to the Erie Canal in New York (p. 83), were also made, and the benefits of another invention began to be felt soon after the year 1827. In that year the first railway was built in the United States ; and, as years passed, railway lines were so extended that even those regions that were at a distance from the rivers could be reached easily and quickly.

[1] "The United States of America," by N. S. Shaler, Vol. I, p. 296.

These several improvements in the manner of travelling and carrying freight have exerted an immense influence upon the rapidity with which the Mississippi Valley has been settled. While 150 years had been consumed in pushing the settlements westward to Ohio and Kentucky, it required less than one-quarter of that time to extend them twice that distance farther west. Now, in spite of the great cities along the Atlantic coast, more people are living west of Cincinnati than east of it (Figs. 235 and 236), and the greater part of these are in the Mississippi Valley. Altogether, including the Southern States, that valley now supports a population of about 30,000,000. Large numbers of the settlers have come from Europe, especially from Germany, Scandinavia, and Ireland.

Agriculture

Millions of persons in Europe and in our coast cities look to this valley for their bread, meat, and other food, as they look to the South for cotton.

A Farm in Central Ohio. — All the way from eastern Ohio to central Nebraska, agriculture is a very important industry. The farms vary greatly in size, from a few acres to several thousand, but they usually contain from 80 to 160 acres. In the main, they resemble the one in Ohio that is described below.

This Ohio farm of 160 acres has a house upon it in which the family lives, with a barn near by for horses, milch cows, and hay, and with a few sheds around it for grain and farming implements.

A windmill in the rear keeps the milk house well supplied with cold water, and also fills the water troughs in the barnyard. On one side is an orchard having apple, peach, and pear trees, with a few rows of berry bushes in one part, and a chicken house in another, where enough chickens are raised to supply some meat, and all the eggs that are needed, with perhaps some to sell. On one side of the front yard are a few beehives, and back of them, between the orchard and the barn, is a garden for vegetables. Still back of that are several pig-pens, in which hogs are fattened for home use and also for the market.

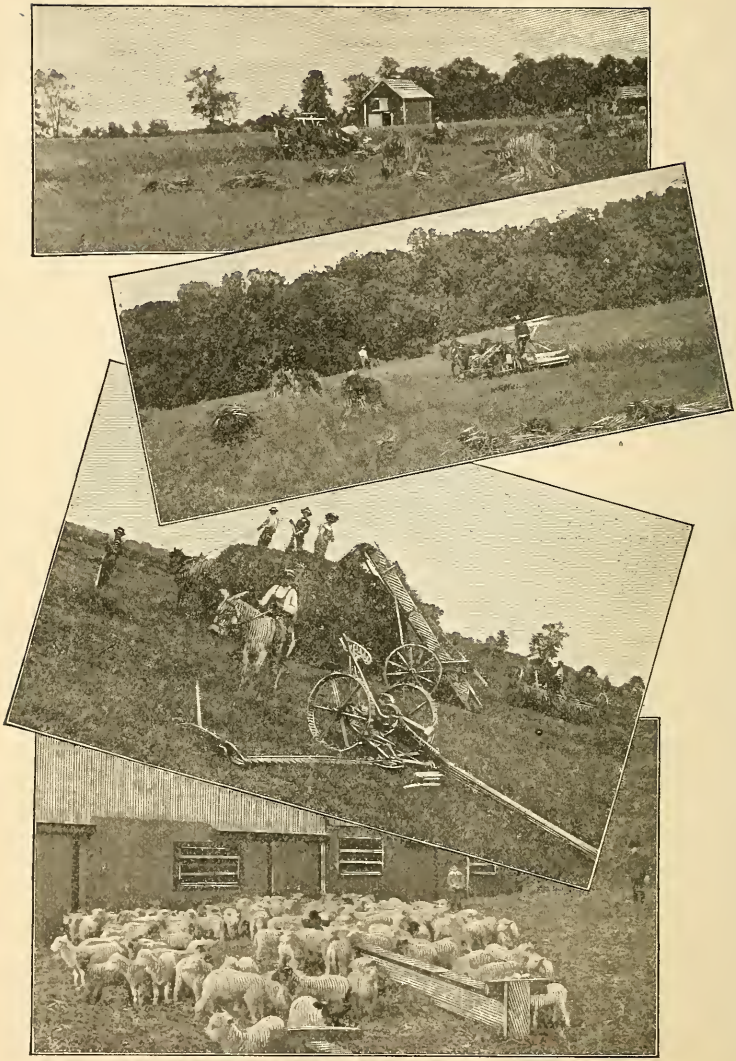


FIG. 118.

Scenes on a farm in Ohio. Tell what you see in each picture.

Farther away from the house are fields in which there are at least three or four different kinds of crops. Every farmer in that vicinity expects to grow corn, perhaps sixty acres of it, some grass for grazing and for hay, and wheat or some other kind of grain. After these crops are harvested, they are either sold, or fed to stock — horses, cattle, hogs, or sheep — upon the farm. The latter plan is often followed, chiefly because it pays better to fatten stock and sell it than to sell the crops themselves. There are generally two or three good milch cows on hand, which not only supply the family with fresh milk and butter, but furnish some cream or butter to sell.

Since there are only three other houses in sight of this farmhouse, and there is no store or post-office nearer than two and a half miles,

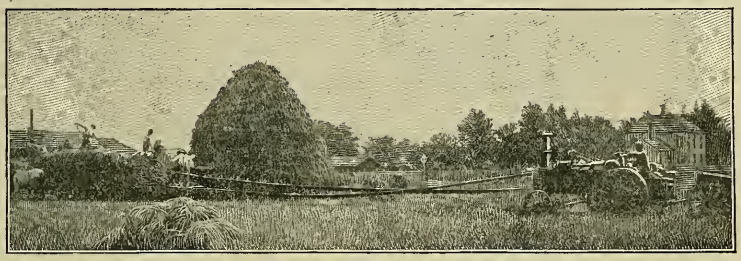


FIG. 119.
Threshing wheat on a farm in Ohio.

the farmer and his family may not be able to visit with other persons for several days at a time, although they often see acquaintances driving by. In the busier season, from spring till fall, they make few trips to town, and then mainly for groceries or mail, or to church on Sunday; but at other times of the year they have leisure for reading, visiting, and other pleasures.

Some persons would not care for such a life because it is too lonesome, and there is too much hard work connected with it. But this farmer enjoys it greatly, because he likes to take care of his stock, to work in the soil, and to watch the crops grow. In addition to this, he is able to raise most of his own food, and his whole life is more independent than that of persons in a village or city. From such farms have come some of our ablest and best-educated men.

Can you name two Presidents who spent their childhood on farms of the Central States? Where were their homes? What can you tell about their early life?

Fruits. — While each farm usually has a small orchard, like the one mentioned above, fruit raising is a special industry in those parts where climate and soil are favorable, as in the neighborhood of the Great Lakes. The immense area of water renders the summers cooler and the winters

FIG. 120.

A fruit orchard in Kansas.

warmer than they would otherwise be. Accordingly, we find the Chautauqua grape belt (p. 72) extending from New York a long distance into Ohio; and quantities of such fruit as peaches and apples are produced on the peninsula of Michigan. With what part of the Atlantic coast can this fruit region be best compared? (p. 73.)

Tobacco. — Tobacco is another product of importance in these states (Fig. 244). We have seen that its cultivation was one of the industries in Virginia, North Carolina, and Tennessee (pp. 72 and 100). West of these states there are also sections, in both Kentucky and Missouri, where the soil and climate are favorable to tobacco raising. Both LOUISVILLE and ST. LOUIS are important tobacco markets. What other cities have the same industry? (pp. 72 and 100.)

Fine Stock in Kentucky. — Kentucky is famous for its blue grass in the neighborhood of LEXINGTON, and for its fine stock, especially horses and mules. The reason why this grass is so nourishing is that the Kentucky soil in this section is composed of bits of decayed limestone in which is found an abundance of lime phosphate, an excellent plant food (p. 107). This phosphate is supplied from the shells of small sea animals which were buried in the sea bottom millions of years ago. As the limestone decays, the phosphate mixes with other rock bits and thus fertilizes the soil.

Caverns. — The abundance of limestone in Kentucky is the reason for the numerous caves that exist there. Limestone, although hard, is more easily dissolved by water than other rocks; and as the rain water seeps into the earth and enters the limestone along the joints, it slowly dissolves the rock away. In this manner many a long tunnel has been made, the largest that is known being the Mammoth Cave in Kentucky.

Not all parts of Mammoth Cave are yet known, but it is said that there are more than 150 miles of galleries. They are found to wind about irregularly, some being many feet below others, and altogether forming a network, or *labyrinth*, into which one dares not venture without a guide. The entire cavern is as dark as any mine, and the only sound to be heard is that of trickling water.

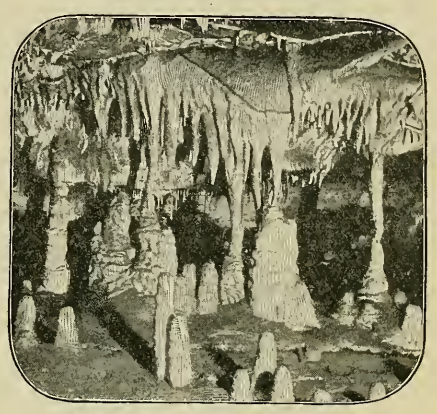


FIG. 121.

A view in one of the Kentucky caverns, showing the icicle-like stalactites, which are made of limey matter deposited by the water which slowly trickles from the cave roof.

Corn. — Corn raising is one of the most important industries of the Central States (Fig. 237, p. 225). A farmer usually expects to

FIG. 122.

A field in Kansas entirely given over to corn.

devote from one-third to one-half of his land to it; therefore, in travelling across these states in summer, one sees corn-fields in every direction (Fig. 122).

The seed is planted in rows in the spring time. Soon the little stalk appears above ground, growing rapidly during the hot summer months, until a height of from seven to ten feet is reached. In order to keep the soil soft and kill the weeds, the ground between the rows is ploughed when the corn is young; but as it grows higher, the shade of its own leaves protects it both from drought and weeds.

A field usually presents the most beautiful appearance in July, when the corn "tassels [out." The leaves then entirely hide the ground from view for hundreds of acres, and the rich green stalks, with their long, slender leaves, bend to the breezes in the most graceful manner. If the stalk is to be used as fodder for cattle in winter, it is cut before frost, when the kernels on the cob are still somewhat soft and milky, although much harder than the green corn which we eat. If left until after frost, the grain hardens, and then the harvest season begins. Men drive into the fields in wagons, and tear the husks from the ear, spending day after day at that kind of work.

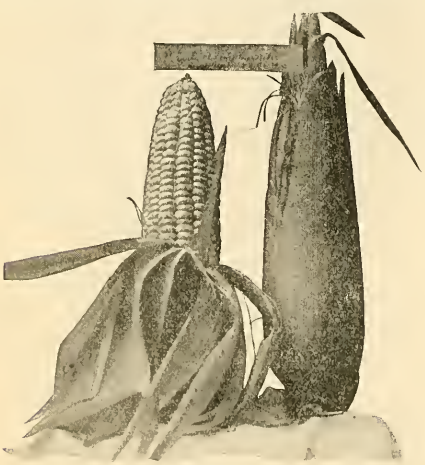


Fig. 123.

Two ears of corn, one with the husk stripped down to show the kernels.

Corn is put to many uses. Much that is raised is fed to cattle and hogs, as already stated. Some is made into hominy and breakfast foods, or into corn meal for mush and corn bread. Starch is another product; but one of the most extensive uses of the grain is in the manufacture of whiskey in a *distillery*. There are many distilleries in St. Louis, Louisville, and other cities within the corn belt. Peoria, in central Illinois, is another great centre for the manufacture of whiskey and other materials from corn. Much corn is shipped eastward to the seaboard and beyond, and all the cities along the way make profit from handling it.

Wheat. — This grain, like corn, is produced in all the Central States as well as in other parts of the country (Fig. 239, p. 226). It is an especially important product in Ohio and Indiana; but the

section which at present is most noted for wheat is the valley of the Red River of the North. In this valley is a strip of land, including western Minnesota, eastern Dakota, and a portion of Manitoba, which is one of the finest wheat regions in the world.

One of the reasons for its fertility dates back to the time when the glacier was melting away from this region. The ice then stretched across the Red River valley, and forced that river to seek an outlet southward. A broad lake was thus formed, with an ice dam on the north, and in the water of this lake the sediment was deposited which forms much of the soil of the wheat region. When the ice melted entirely away from the valley, the Red River was once more able to flow northward, and then the lake disappeared.

The land there is almost as level as the surface of the sea (Fig. 124); it is so level, in fact, that after a rain the water stands in shallow sheets in the fields. Also the roads need to be elevated a foot or more above the surrounding land, with ditches on either side. In every direction there is nothing to break the view except a farmhouse every half mile or so, with a few trees around it. Over these open plains the wind sweeps with terrific force, somewhat as upon the ocean, and fierce, blinding snow squalls, or *blizzards*, are not uncommon.

Upon these plains one may ride northward on the train toward Winnepeg all day long, and see scarcely a single crop besides wheat. Most of

FIG. 124.

A view over the broad wheat fields of the Dalrymple farm. A grain elevator, belonging to the farm, is seen in the distance where the Northern Pacific Railway runs.

the farms are of moderate size, but some are enormous. For example, the Dalrymple farm, at Casselton, North Dakota, contains fifteen thousand acres. How many square miles is that?

This farm is divided into six parts, with farm buildings upon each. To prepare the ground, from fifteen to twenty men at a time plough and sow the seed on each division. One takes the lead, the next follows close

Fig. 125.

Harvesting wheat in the Red River valley.

behind, then comes the third, fourth, and so on. The grain is harvested on a similar plan (Fig. 125). One hundred and twenty men and three hundred horses are employed in the planting season, and three hundred men during the harvest. As one acre usually produces from fifteen to twenty bushels, an immense amount of grain is obtained from this one farm.

The great quantity of wheat produced in the Red River valley of the North and the neighboring region has helped in the growth of the cities of Minneapolis, St. Paul, and Duluth. It has also influenced the growth of scores of other cities along the Great Lakes, the Mississippi River, and even on the Atlantic coast. Some of the largest of these are St. Louis, Milwaukee, Chicago, New York, and Baltimore. Can you suggest reasons for this?

Other Grains. — Besides corn and wheat, two other grains are raised in great quantities in these states; namely, oats and barley. The former is a common food for horses, but the latter is largely used in the manufacture of beer. The great breweries, to be seen in every large city, consume immense quantities of barley in order to obtain the *malt* which is needed in making beer. In Cincinnati and St. Louis, and in many other places,

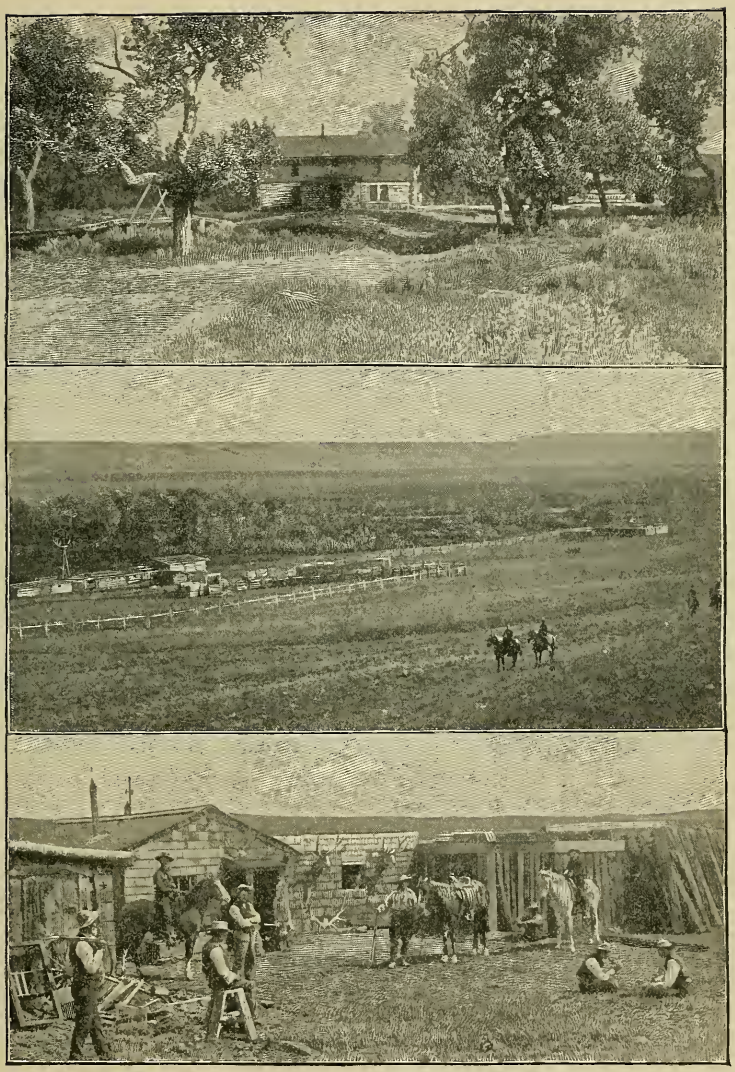


FIG. 126.

Scenes in the ranch country. Upper picture, a typical ranch house on the banks of a stream in western North Dakota. Middle picture, a ranch house and "the range." Lower picture, a group of cowboys at the ranch house.

beer making is one of the important industries. Milwaukee is also noted for beer, much as Peoria is for distilled spirits.

Cattle Ranching. — After passing westward from the fertile Red River valley of the North, one finds the farm-houses diminishing in number, and the country becoming more and more arid, until, beyond the 100th meridian, there is practically no farming without irrigation. At the same time one gradually rises higher and higher, until, near the base of the mountains, he has reached an elevation of fully a mile above the sea. This dry plateau, extending from Canada to southwestern Texas (p. 98), is commonly known as the *Great Plains*.

The entire semi-arid western third of the western tier of states — from Texas to North Dakota — is therefore devoted chiefly to ranching. Following is a description of ranch life in western North Dakota, which much resembles such life in other states : —

Fig. 127.

A scene during a round-up, when great numbers of cattle are bunched together.

There is little water anywhere else than in the widely separated streams; and there are almost no trees except upon their banks. As the ranchman must have both water and timber, he locates his house (Fig. 126), with its few stockades or *corrals*, and sheds, within easy reach of these necessities. If there is no neighbor within several miles, it is all the better, for his cattle are then more certain of abundant grass.

Few fences are built, partly because it is necessary for the cattle to roam about at will in their search for food. The bunch grass, upon which they feed, is so scattered that they must walk a long distance each day to find enough to eat. A single ranchman may own from ten to twenty

thousand head, and yet they are all allowed to wander about upon public land, called "the range." Usually they keep within a distance of thirty miles of the ranch house; but sometimes they stray one or two hundred miles away.

Twice a year there is a general collection, or *round-up* (Fig. 127), of cattle, — the first round-up occurring in May or June, and the other early in the fall. One object of the first is to find the calves that have been born during the winter.

Since there are few fences, cattle belonging to ranches which are even a hundred miles apart become mixed during the winter, and those in a large herd may belong to a score of different ranchmen. Each cattleman has a certain mark, or *brand* (Fig. 128), such as a letter, a cross, a horseshoe, or some other device, which must be burnt into the side of every cow; and that is the sole mark of ownership.

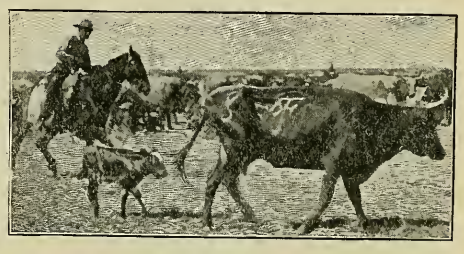


Fig. 128.

Picture showing the mother with her brand, a calf following her, and a cowboy about to catch the calf and brand it.

A round-up, which lasts several weeks, is planned by a number of ranchmen together. A squad of perhaps twenty cowboys, accompanied by a wagon and provisions, a large number of riding horses, or "ponies," and a cook, go in one direction, and other wagons with similar outfits set out in other directions. Before separating in the morning, the members of a squad agree upon a certain camping place for the night, and then they scour the country to bring the cattle together, riding perhaps sixty or eighty miles during the day. Each ranchman knows his own cattle by the brand they bear; and since the calves follow their mothers (Fig. 128), there is no difficulty in determining what brand they shall receive. After branding the calves, each ranchman drives his cattle homeward to feed during the summer within a few dozen miles of their owner's home.

The second large round-up is similar to the first, except that its object is to bring together the *steers*, or male cattle, and ship them away to market; it is accordingly called the *beef round-up*. A ranchman who owns twenty thousand cattle may sell nearly half that number in a season. As the steers are collected they are loaded upon trains and shipped to Omaha, Kansas City, St. Louis, Chicago, and even farther east. Millions of cattle are slaughtered every year in these cities (Fig. 136), and the meat

is sent to England and Germany, as well as to all parts of the United States.

Very often the cattle find so little water, and such poor pasturage, that they fail to fatten properly, and must be fed for a time. This may be done upon the irrigated fields near the rivers in the ranch country, or on the farms farther east, as in Kansas, Iowa, and Nebraska, and even in Illinois, Indiana, and Ohio. Thus we see how a great product of one section of the United States is made to furnish employment and food for millions of persons far away.

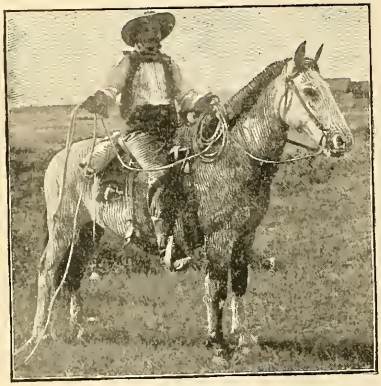


Fig. 129.

A cowboy with his rope, or *lariat*, with which he captures the steers by throwing a noose over their necks, or around their legs.

The lives of ranchmen and cowboys are exciting and interesting, most of each day being spent in the saddle (Fig. 129). They are so far separated from other people that they must take care of themselves in a surprising number of ways. For instance, a ranchman must build his own house, kill his own beef and dress it, put up his own ice, raise his own vegetables, do his own blacksmithing, find his own fuel, and even keep school for his children, if the latter receive an education. He affords a good example of the pioneer life in early days.

Lumbering. — Although so much of the land is under cultivation, or given over to ranching, forests are found in many sections. When the region was first visited, most of Minnesota, Wisconsin, and Michigan was tree-covered, as well as much of Ohio, southern Indiana, and Illinois, and the Black Hills of western Dakota. Even now some forest is left, although there has been so much lumbering that large areas have been entirely cleared.

In Wisconsin, for instance, in travelling northward from the well-cultivated southern portion, one comes to a section where farmers are just taking the place of lumbermen. Many log huts stand there in small clearings, with the green fields still dotted by tree stumps ; but beyond, little else than woods can be seen. In these forests are many different kinds of northern trees, especially the evergreens, such as

hemlock, spruce, white pine, and cedar, and scattered hard woods, such as oak, birch, and maple.

In the neighborhood of the Great Lakes lumbering is actively carried on, and in much the same manner as in Maine (Fig. 130),

Fig. 130.
Floating timber on a stream in Wisconsin.

although a great deal of the timber is brought to the sawmills by wagons or rail, instead of being floated a long distance down stream. The excellent water power in the Mississippi River at Minneapolis

Fig. 131.
A sawmill in Wisconsin.

early attracted large sawmills there and made that city famous for lumber (Fig. 141, p. 143). Other mills are situated farther down the Mississippi, as at Winona. They are also numerous at Duluth, and at Superior just across the state line in Wisconsin.

Near the forest regions, along the streams and on the shores of the Great Lakes, the manufacture of furniture and other articles of wood is an important industry. CHICAGO is especially noted for its manufacture of furniture ; and on many of the small streams of Minnesota, Wisconsin (Fig. 131), and Michigan, where there is water power, there are sawmills, furniture factories, and planing-mills. Some of these are at LA CROSSE and OSHKOSH in Wisconsin, and SAGINAW, BAY CITY, and GRAND RAPIDS in Michigan. Many school desks are made at the last place.

MINERAL PRODUCTS

Building Stone. — It has been stated (pp. 2 and 7) that the ocean once covered much of this section, and that layers of sediment deposited under the water have hardened into rock strata, which have been raised to form the dry land. During their uplifting they were not folded and broken, as mountain rocks are, but the layers were left in a horizontal position, as when first laid down in the ocean. The streams, cutting their valleys downward through the soil, have brought many of these rock strata to light, and among them are beds of limestone and sandstone which are of value as building stones.

Ohio and Indiana are especially noted for their limestone and sandstone, which are shipped in all directions for building purposes. There are also slates and granites in the hilly and mountainous sections, as there are in hilly and mountainous New England (p. 50).

Petroleum and Natural Gas. — Power for manufacturing is also abundantly provided in this region. When oil and natural gas were first discovered in New York and Pennsylvania, it was supposed that they did not exist elsewhere ; but great quantities of both these substances are now obtained in Ohio, Indiana, West Virginia, and other states. Many farmers, whose land is capable of producing only the usual crops, have suddenly found themselves rich by the discovery of oil or gas in the rocks far beneath the soil. In fact, these materials are so abundant in some places, that towns have sprung up like mushrooms, — as FINDLAY in western Ohio. The way in which gas and oil are formed, and the uses to which they are put, have already been described (p. 76).

Coal. — This mineral fuel is much more widespread in the Central States than oil and gas. In some places the beds lie near the surface, like rock in quarries, and then coal mining is very simple; in others it is buried so deep that long shafts must be sunk to reach it. Being so valuable a fuel for houses and manufactories, the coal is mined in many places.

While Pennsylvania produces two kinds of coal, anthracite and bituminous, the Central States have only the latter variety. It is bituminous coal that is used in making coke; and because there is so much of this kind of coal, many of the cities of these states are engaged in iron manufacturing. Soft coal produces more smoke than the hard anthracite, and those cities which burn great quantities of it are very sooty in consequence.

Iron Ore. — Formerly Pennsylvania was the chief iron-producing state, having both coal and iron ore; but in recent years, explorers in the forest wilderness northwest of Lake Michigan, and near the western end of Lake Superior, have discovered what seem to be inexhaustible beds of iron ore. In some places the ore is so soft that, like clay, it can be dug out by steam shovels, and so near the surface that the mines are open pits (Fig. 132). That is the case, for example, at ISHPEMING, in northern Michigan.

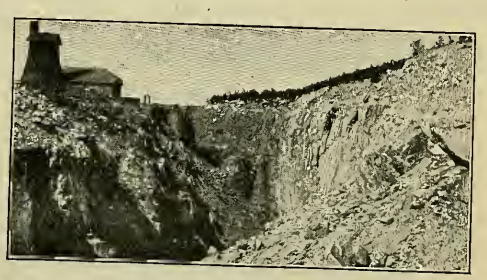


FIG. 132.
An open iron mine in the Lake Superior district.

This Lake Superior district is now the leading iron-producing centre in the world. The main difficulty, however, is the fact that there is no coal in that region. Consequently, in order that the ore may be reduced to the metal, either coal must be transported thither, or the ore must be carried to the coal regions. The latter process has proved the cheaper.

Fortunately the ore deposits are located near waterways. If it were necessary to carry the iron ore a long distance by rail, the expense might

be so great as seriously to check its production. As it is, however, the ore is mined, loaded upon cars, and sent over short lines of railway to the lake shore. Great ore docks (Fig. 133), or piers, reaching far out into deep water, have been constructed to hold the ore. Railway tracks are built

Fig. 133.
Iron ore piers at Ashland, Wis.

upon the docks, and whole trains run out and speedily dump their contents into bins. On a single pier there are scores of bins, which together hold enough ore to fill several large vessels. When a vessel is to be loaded, it is moored to the pier (Fig. 134), and a door at the bottom of a

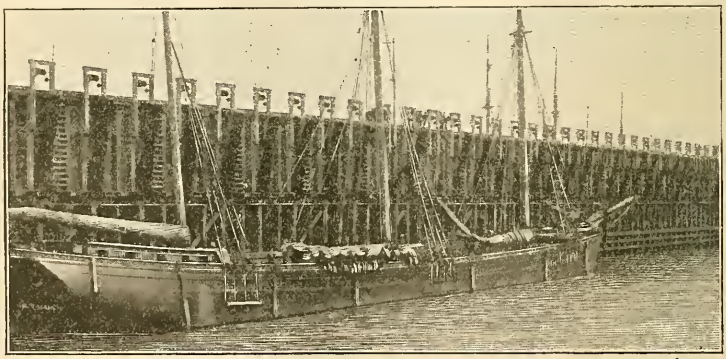


Fig. 134.
A lake boat loading with iron ore at the docks (Fig. 133).

bin is opened, allowing hundreds of tons of ore to slide out; then the next bin is emptied, and in this way the vessel is filled in a few hours.

Boats with such a cargo set out from the lake ports of Duluth, Superior, Ashland, and Marquette for manufacturing centres

all along the lakes. As the ore must reach a point where coal is easily obtained, it is taken to CHICAGO, DETROIT, CLEVELAND, BUFFALO, etc. Notice how close to these cities the coal beds extend (Fig. 248).

The Lake Superior iron district is in three states, — Michigan, Wisconsin, and Minnesota, the most important being Michigan (Fig. 250), and the least important Wisconsin. These three states together produce seventeen times as much ore as Pennsylvania. The sudden development of mining in this region has brought so many people that numerous towns and cities have grown up; but the lack of coal has prevented much iron manufacturing.

Copper. — Another very important metal found in the Central States is copper. This occurs in the pores of a lava rock and between the grains of a pebble beach which, though now hardened into rock, was formed in the ancient sea. Indians and the early explorers found fragments of copper on the surface, and mines were later opened in the lava and beach rocks of the small peninsula marked Mineral Range on the map (Fig. 116).

Some of these mines are very deep, one of the shafts reaching to a depth of about a mile. When the ore is drawn to the surface, it is found mixed with so much beach rock and lava, that it must be crushed to a powder under powerful hammers, or *stamps;* then water is run over it in order to carry away the bits of rock and leave the heavier particles of copper. Even after this, some foreign substances are still mixed with the copper. Since the purposes for which this metal is used demand that it be very pure, it must next be placed in a large *smelter* to be melted and thus separated from the impurities. Among the latter is a little silver, which is saved. The pure copper is allowed to run out of the furnace and cool in bars to be shipped away.

The largest mines in this region are near together, and so many men are required to obtain the ore, and change it to pure metal, that towns of large size have grown up in a wilderness which otherwise could scarcely have attracted many people. Within a few miles of two or three of the most important mines are a number of towns having a total population of fifty thousand, the largest being CALUMET. Many of these persons are miners and families of miners; but there must, of course, be storekeepers, physicians, teachers, ministers, etc., and they all depend for a living upon the precious copper buried far beneath the surface.

Copper is valuable in many ways. It is one of the metals which form bronze, and also brass; but of late years the wide introduction of electricity has created a new and even greater demand for this metal. Since copper is a substance which allows electricity to pass through it more easily than other common metals, it is the best material for trolley wires, the wire of long distance telephones, electric bells in houses, etc. In every city in the land much copper is used.

As in the case of iron ore, the metal is shipped to points along the lakes, and elsewhere, by water and by rail, much of it going to the metal manufactories in the New England cities (p. 60). Name some goods that must be shipped *into* this section instead of away from it.

Lead, Zinc, etc. — Lead and zinc, two other metals found in the Central States, occur together in pockets and little veins, in layers of limestone. The ores are mined in many places, as at JOPLIN, Missouri, and then sent to the proper kind of furnaces where the pure metals are extracted.

A large part of our supply of lead and zinc is obtained from Missouri, Kansas, Wisconsin, and Iowa, the first-named state producing more zinc than any other in the Union. For what purposes are lead and zinc used? Of what use should you think this lead was to the early pioneers?

Besides these metals, *gold* is mined in considerable quantities in the Black Hills in the extreme western part of Dakota.

Much *salt* is also obtained in the Central States, especially in Michigan and Kansas.

Clays. — The deep soil left in the prairie states by the glacier is often a clay which is useful in the manufacture of bricks; and, as in other sections of the country (p. 82), there are many brickyards, especially near the large cities. From this same kind of clay, other articles, such as flower-pots and drain-pipes, are manufactured. During recent years, when drainage of farm land has become so common, the manufacture of tile for that purpose has developed into a great industry, many a small town having a tile factory. These objects are made in much the same manner as brick (p. 82), except that the clay is pressed into other forms.

There are a number of places where fine pottery also is made. For instance, a very high grade, known as Rookwood ware, is manufactured in CINCINNATI. The best of clay is needed for this, and some of it must be brought from a distance. The first step in making a vase is to wet a

lump of clay so that it may easily be moulded, and then shape it upon a rapidly revolving wheel, known as the potter's wheel (Fig. 84), which has been in use for centuries. There it is whirled rapidly round while a man moulds it with his hands, in a very few minutes changing a shapeless lump into a delicately formed vase. It must then be baked. After the baking, flowers or other ornaments may be painted upon it. The surface is finally covered with a substance which, when baked, produces a *glaze*. One of the beauties of the Rookwood ware is the peculiar color of the glaze, which is a dark brown or yellowish brown.

Principal Cities and Shipping Routes

It is evident that the raw products of the farms, ranches, forests, and mines in the Central States must lead to much commerce ; and that, since coal is included among the raw products, manufacturing must also be developed. This means, of course, that there must be many large cities ; and since the Central States have no ocean coast, we naturally find them along the Great Lakes and the three great rivers, — the Mississippi, Ohio, and Missouri, —where it is possible to ship goods by water. Let us first consider those along the Great Lakes.

THE LAKE CITIES

Duluth and Superior. — At the western end of Lake Superior there is a fine, large harbor, one side being in Minnesota, the other in Wisconsin. Upon this harbor are two cities, Duluth and Superior, which together have a population of little less than one hundred thousand. The chief products of this vicinity are iron, lumber, and wheat, which are shipped eastward in immense quantities from these two ports. Owing to the neighborhood of the Minnesota and Dakota wheat fields, there are enormous elevators at Duluth for storing grain, and flour-mills for grinding it up. The iron ore docks, sawmills, and lumber wharves are also busy places.

Goods are shipped *to* this point as well as away from it; for while the people in this section have some materials to spare, they also need many others, as farming implements, clothing, various kinds of food, furniture, and coal. These goods are brought cheaply, because the vessels carrying ore, wheat, and lumber eastward must have something to bring back. As

already suggested (p. 83), it is the needs and products of the inhabitants of this distant region which help to make Buffalo, Montreal, and New

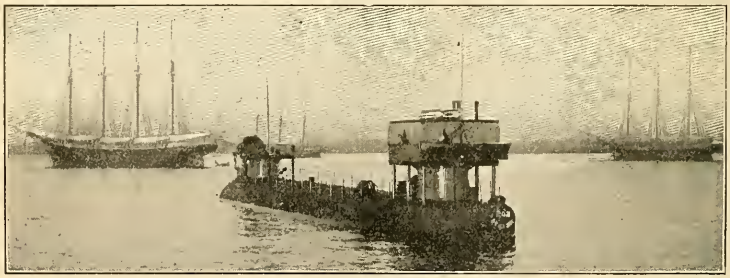


Fig. 135.

Lake vessels, the one in front being called a whaleback.

York so important, and to keep the mills and factories of New England so busy. Explain how this is true.

At the outlet of Lake Superior into Lake Huron, there are rapids which interfere with navigation; and to avoid these a ship canal, called the Sault Ste. Marie, or "Soo," canal, has been dug. On its banks is a city of the same name.

Chicago. — While Lake Superior extends far into the Central States in one direction, Lake Michigan reaches a long way in another; and near its southern extremity, in Illinois, the great city of Chicago is located. At this point the small Chicago River empties into the lake (Fig. 117), forming a small harbor, and in early times a fort was located there. The harbor itself was formed thousands of years ago while the great glacier was melting away. At that time, the ice sheet lay across Lake Michigan, forming a huge dam which prevented the waters from flowing into Lake Huron and the St. Lawrence River. This compelled the water to find an outlet southward, past the present site of Chicago, and into the Illinois River and the Mississippi. It was the wash of this water which dug out the small harbor.

As the West developed, this site proved to be a most advantageous one; for whenever a railway was built from the East to the Northwest, from any place north of Washington, it was necessary

for it to pass around the southern end of Lake Michigan. Of course, as the city grew in size, other railways were built to it *because* it was large; and now they approach it from the East, West, North, and South (Fig. 117).

Chicago is the nearest lake port to the most productive grain region in the world, and it is therefore an important shipping point for grain. It is also within easy reach of the coal fields, while lumber and iron ore are readily brought to it by boat. These facts have caused Chicago to grow with wonderful rapidity, so that it has long since outgrown its small natural harbor, which has been enlarged by extensive breakwaters (Fig. 117). In the year 1840, there were but 4,470 inhabitants; in 1870, 300,000; and now 1,698,575. To-day Chicago is the second city in size in the New World.

Stock Yards of Chicago. — Chicago is not only a great grain market, but also the most important meat market in the world. All the grazing states of the West ship stock to this point, and in the city itself nearly a square mile is taken up by the Union Stock Yards, consisting of large sheds, pens with high fences, and troughs for food and water (Fig. 136). Train loads of cattle, hogs, and sheep are unloaded there every day. The work employs about thirty thousand men, which indicates how extensive it is.

FIG. 136.
The Chicago stock yards.

The products of the packing houses are several. By far the most important is meat; and so well developed is the industry that most of the cities of the East are furnished with fresh meat from the Western cities. It may be several weeks after the meat is prepared for food before it reaches the table; yet all this time it is kept fresh by the use of ice. Special refrigerator cars are constructed for the purpose of carrying it.

Besides what is sold fresh, a great deal is canned. The fat of the hog is made into lard, and not a little beef fat is converted into imitation butter, such as oleomargarine. From the bones, also, valuable products are obtained. Many of the bones are burned and used in the manufacture of sugar (p. 104); and the horns and hoofs are of use in making gelatine and glue.

The hides are made into shoes, gloves, harness, and other leather goods. From the Western packing houses the great shoe factories of Lynn, Haverhill, and Brockton, in Massachusetts, as well as those in other parts of the country, are supplied with a large part of their leather. The hides, however, must first be sent to tanneries, one of the principal places being MILWAUKEE, which is supplied with tannic acid from the bark of the hemlock tree which grows in the forests of Wisconsin. Nothing is wasted in the packing business; even the bristles of the hog are saved to make brushes; and the hair removed from the hides of cattle is valuable in making plaster.

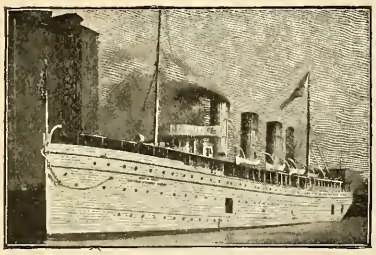


FIG. 137.
A lake steamer at Chicago.

Manufacturing in Chicago. — Being near the forest regions, Chicago has become a lumber market; and iron ore is also easily brought by boat. Therefore, the opportunities for manufacturing are excellent; for, although there is no natural water power in that vicinity, vast coal fields are not far away.

The Illinois Steel Company alone employs ten thousand men, making iron and steel goods of many kinds. An enormous amount of furniture is manufactured for all parts of the West, and farming implements as well. Each year the McCormick Harvesting Machine Company sends out about three hundred thousand machines. The Pullman Car Works manufacture more than ten thousand freight cars, besides several hundred Pullman and passenger cars. The manufacture of clothing, as in New York (p. 86), is also an immense industry.

Other Facts about Chicago. — The sewage from the city has heretofore been emptied into Lake Michigan; but as the drinking water must be taken from the lake, it became necessary to dispose of the sewage in some

FIG. 138.

Map showing the location of St. Louis, Kansas City, Omaha, Minneapolis, and St. Paul.

FIG. 139.

Map showing the location of Detroit, Cleveland, Cincinnati, and Pittsburg.

other way. For that purpose an immense drainage canal has recently been completed (Fig. 117), connecting Lake Michigan with the Illinois River, and thus setting the current toward the Mississippi and the Gulf of Mexico. This drainage canal, which is wide and deep enough for vessels, will undoubtedly develop into a ship canal. In that case, large boats may reach Chicago from the Gulf of Mexico as they now do from the Gulf of St. Lawrence. What effect would this have upon the city?

The chief educational institution is the University of Chicago, which, although established in 1890, has more students than some of the older universities of the East. Mention some of the larger Eastern universities.

Other Cities along the Lakes. — Other great cities along the lakes are engaged in many of the same industries as Chicago, and need not be so fully described. MILWAUKEE (Fig. 117), the largest in Wisconsin, deals extensively in grain, lumber, and leather, packs much pork, and manufactures a great quantity of flour and machinery. Its immense breweries have already been mentioned (p. 28).

DETROIT (Fig. 139), the largest city in Michigan, is also on the Great Lakes water route. The name is a French word for strait. Why suitable here? All vessels going east or west must pass this city; and some of the railway trains from eastern Canada to Chicago and the West are ferried across the strait at this narrow point. Detroit is consequently a shipping and manufacturing centre, dealing in grain, wool, pork, and ores from the West, and making iron and steel goods, such as cars, stoves, etc.

Not far away, at ANN ARBOR, is the University of Michigan, one of the largest educational institutions in the United States. It is supported by the state; in fact, state universities are established in most of the Central, Southern, and Western States.

On the lake shore in Ohio the chief cities are TOLEDO and CLEVELAND (Fig. 139). The former has extensive flour-mills and iron manufactories; and the latter, which is much the larger, and even larger than Cincinnati, Detroit, and Buffalo, has an important trade in grain, lumber, and ore. Being near the coal and petroleum fields, Cleveland is extensively engaged in manufacturing machinery and furniture, in refining petroleum, and in ship-building for the lake commerce. It is one of the busiest and most rapidly growing of the lake cities.

THE RIVER CITIES

Cities along the Mississippi. — The largest city on the rivers, corresponding to Chicago on the lakes, is ST. LOUIS in Missouri (Fig. 138). It has a very favorable position in the centre of the productive Mississippi Valley. This, together with the fact that it is situated on the Mississippi River near the mouth of its two largest tributaries, secures for it a large amount of trade both by water and by rail. The location of railway bridges across the broad Mississippi at this point has also had an immense influence on the growth of the city.

Like Chicago, St. Louis is an important market for grain and live stock ; but being so far south, it also trades extensively in Southern products, especially cotton and tobacco. This city is also a noted mule and horse market, and a great manufacturing centre. It manufactures immense quantities of tobacco, beer, flour, boots, shoes, clothing, and hardware.

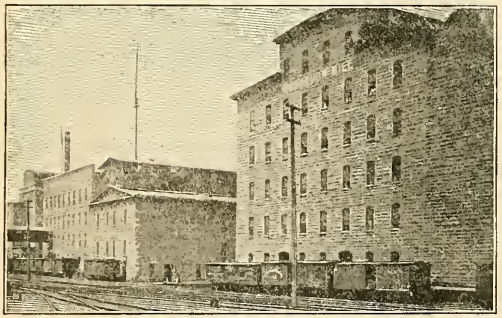


FIG. 140.

The Pillsbury-Washburn flour-mills at Minneapolis.

Formerly Chicago and St. Louis were almost the only noted markets for grain and live stock in the West; but in later years several other cities have become prominent in that section. Two of these are the "twin cities," MINNEAPOLIS and ST. PAUL (Fig. 138). The latter, the capital of Minnesota, is a trade centre. From it the products of the West are sent eastward and southward, while farming implements, furniture, clothing, and other articles are distributed among the smaller towns of the vast farming region round about.

MINNEAPOLIS, only ten miles distant, is located at the Falls of St. Anthony, which furnish splendid water power. It is also in the midst of the wheat region ; and this, together with its water power,

has caused Minneapolis to become the leading flour-producing centre in America. In the city are many grain elevators and flour-mills (Fig. 140).

One of these flour-mills, belonging to the Pillsbury-Washburn Company, is the largest in the world. Steam shovels scoop the grain from the trains very rapidly, emptying a car of 750 bushels in eighteen to nineteen minutes. All straw, useless seeds, sticks, etc., must first be separated from the grain, and then it passes through many different machines before the pure flour is produced. During this process it must be raised to the top of the building twelve different times, being carried up by rapidly moving belts having many small buckets, or pockets, attached.

Just inside the husk of a wheat grain is the kernel, the most valuable part of the wheat. First, the husk is removed by machinery, and this is

FIG. 141.

Logs in the river near Minneapolis. One of the bridges across the Mississippi River at this point is seen in the background.

sold for bran and shorts, while the centre, called the heart, or germ, is made into breakfast food. The other portion is ground into flour, poured into sacks and barrels by machinery, and then sent sliding down an inclined plane into the cars which stand near by. This one mill has ground as much as 61,000 barrels of flour in six days. In 1899 the daily capacity of five mills owned by this company was 25,000 barrels. It would require 400 cars, or 20 trains of 20 cars each, to bring the grain needed each day, and to carry away the flour and other products.

What have you already learned about the influence of the St. Anthony's Falls on the lumber industry of Minneapolis?

Other smaller cities on and near the Mississippi, between this point and St. Louis, are WINONA in Minnesota; LA CROSSE in Wisconsin; DUBUQUE, DAVENPORT, and DES MOINES in Iowa; and QUINCY and PEORIA

in Illinois. Each is important either for lumber, grain, or farming implements, or for all three combined.

Cities along the Missouri. — The leading cities on the Missouri River are Omaha in Nebraska and Kansas City (Fig. 138) in western Missouri. Each is surrounded by a fertile farming country which produces much grain. Each is also a market for cattle, sheep, and horses raised near by and in the semi-arid region farther west. Being so near the ranch country, both of these cities have a certain

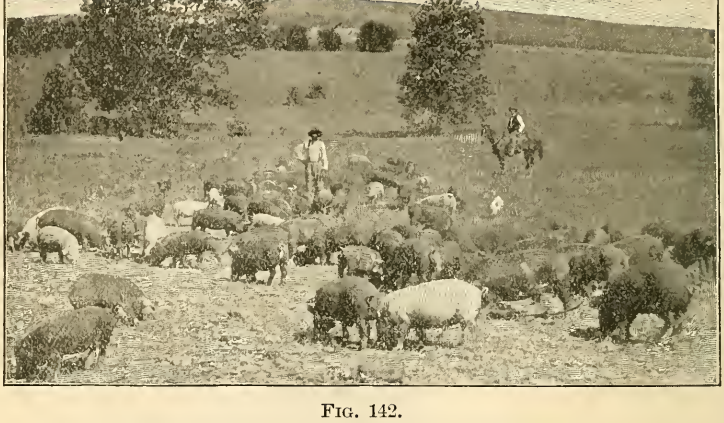


Fig. 142.

Hogs in Kansas being fattened for the market.

advantage over St. Louis and Chicago, and their meat-packing industry is gaining rapidly each year.

Southwest of Omaha is Lincoln, the capital of Nebraska; and across the river in Iowa is Council Bluffs, an important centre for farming implements. Several cities northwest of this point are chiefly important as trade centres. Find some of them on the map. On the river above Kansas City is St. Joseph in Missouri, and below it is Jefferson City, the capital of that state. Farther west, in Kansas, are Wichita and Topeka, the capital. Since we know the products of this section, it is clear why most of the larger cities are centres for stock, grain, and flour.

Cities in the Ohio Valley. — In the Middle Atlantic States, three cities of the upper Ohio — Pittsburg, Allegheny, and Wheeling —

were found to owe their importance largely to coal and iron, and to the fact that river boats could reach them.

Farther down the river is CINCINNATI (Fig. 143), the largest city in the Ohio valley, and a great manufacturing centre. Besides pottery (p. 136), this city manufactures large quantities of iron, machinery, and clothing. Across the river in Kentucky are COVINGTON and NEWPORT (Fig. 139), both almost a part of Cincinnati, as Jersey City is almost a part of New York. Farther north and east, in Ohio, are DAYTON and SPRINGFIELD, both noted for the manufacture of farm machinery. DAYTON, like Pullman in Chicago, makes a large number of cars. COLUMBUS, the capital, is an important trade centre and manufactures carriages, wagons, and other articles. The reasons why these cities are engaged in the manufacture of carriages and farm machinery are, first, the presence of the necessary raw materials, such as iron ore, coal, and hardwood; and, secondly, the many farms upon which these manufactured articles are needed.

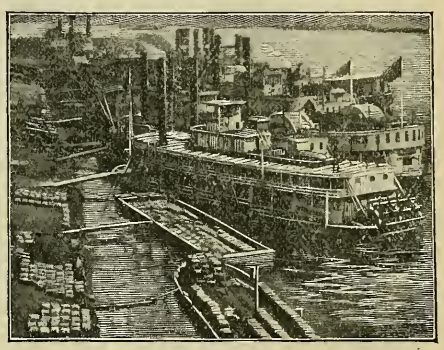


FIG. 143.
River boats on the Ohio at Cincinnati.

Farther down the river is LOUISVILLE, the largest city in Kentucky. There are rapids in the Ohio at this point, and a canal leads around them. Besides being a centre for tobacco, like Richmond and St. Louis, Louisville manufactures iron goods, farming implements, flour, and leather goods. It is also a railway centre for lines reaching into the Southern States.

EVANSVILLE, the largest river port in Indiana, is principally engaged in the manufacture of flour, machinery, and leather goods. INDIANAPOLIS, the capital and metropolis of Indiana, is in the midst of a splendid farming district. It is a railway and trade centre like Columbus, and handles a large amount of grain, lumber, and furniture. What other large cities can you name that are not located upon important water routes?

QUESTIONS AND SUGGESTIONS

Review Questions and Topics. — (1) Describe the physiography: — the plains; the mountains; the prairies; the soil. (2) What about the climate of the section? (3) Tell about the settlement of the Mississippi Valley: — first pioneers; use of the rivers; steamboats; canals and railways; rapid settlement in later years; population. (4) Describe the farm in Ohio: — its size; the buildings; the products; life on the farm. Would you care to live there? Why? (5) What fruits are raised, and where? (6) Where is tobacco raised, and what cities are engaged in its manufacture? (7) What kinds of stock are raised in Kentucky? What is the reason for their fine grade? (8) Describe the Mammoth Cave. (9) Tell about corn: — the planting; the care of the field; uses of corn; cities which handle the corn. (10) Where is wheat raised? (11) Describe the Red River valley of the North. (12) Tell about wheat raising on the Dalrymple farm. (13) What cities have been influenced by this wheat region? (14) What other grains are raised? For what are they used? In what cities? (15) Describe cattle ranching: — where carried on; reason; the cattle ranch; wandering of the cattle; object and nature of the spring round-up; of the beef round-up; what is done with the cattle; the life of the cowboys. (16) Where are the forests? (17) What kinds of trees are found? (18) How is the lumbering carried on? (19) What cities are engaged in lumbering? In the manufacture of articles from wood? (20) What is the origin of the building stones? What kinds are found? Where? (21) Where are oil and gas obtained? Of what use are they? (22) Where is coal found? To what uses put? (23) Tell about the iron mining: — its development; nature of the ore; where sent; reason; manner of loading the vessels; cities sent from and shipped to; states producing it. (24) Study about copper: — where found; how found; mining; obtaining the metal from the ore; towns near the mines; uses of copper. (25) What other minerals are obtained? Where? (26) What clay products are manufactured? (27) Where is Rookwood ware made? How? (28) Where are the principal cities to be looked for? Why? (29) What cities at the western end of Lake Superior? For what are they important? (30) Give the reasons for the location of Chicago and its wonderful growth. (31) Describe meat packing in Chicago. (32) To what uses are the various products put? (33) What manufacturing is carried on in Chicago? Why? (34) State some other facts about Chicago. (35) Briefly enumerate the important facts about Chicago. (36) What other Great Lake cities are there? For what is each important? (37) Name the cities along the Mississippi River, and tell for what each is important. (38) Describe flour milling. (39) Name the cities along the Missouri. For what is each important? (40) Do the same for the Ohio valley.

Review by States: *Ohio* (*O.*). — (1) Name the four largest cities (Appendix). Where is each located? Why there? (2) What other cities of Ohio are mentioned? For what is each important? (3) Why is there much manufacturing in this state? (4) What other industries are mentioned in the text? (5) Examine the maps (Figs. 237 to 244) in order to see what crops are raised in Ohio. (6) In what ways are the cities of Ohio dependent upon New Orleans and New York? How are the latter cities dependent upon those in Ohio? (7) Of what service to

Cleveland and Toledo is the Erie Canal? (8) Draw a sketch map of Ohio like that of Maine (p. 65). As you study each state do the same.

Indiana (*Ind.*). — (9) Examine the maps (Figs. 237 to 244) to see what crops are produced in Indiana. (10) Which is the largest city? For what noted? (11) What other cities were mentioned? (12) What are the industries of Indiana? (13) Examine the relief map to see if the relief seems favorable to farming. What other Central States resemble this in relief? (14) Of what importance was the fact that so large a part of this section was treeless when discovered?

Kentucky (*Ky.*). — (15) Why should this state be better adapted to tobacco raising than Ohio? (16) Of what importance is the limestone of Kentucky? (17) Where are most of the cities located? Why there? (18) What products are mentioned from Kentucky? (19) Which is the largest city? For what important? (20) What other cities are mentioned?

Illinois (*Ill.*). — (21) What industries are mentioned from this state? (22) Examine the maps (Figs. 237 to 244) to see what crops are raised. (23) Why is there much manufacturing in Illinois? What kinds are carried on? (24) Of what value is the lake to manufacturing? (25) State the reasons why Chicago has developed so greatly. (26) What other cities are mentioned in this state? For what is each important? (27) In the Appendix find the population of the three largest cities of each of the four states so far reviewed, and compare them. (28) Which of these four states is the largest? Which smallest? (Appendix.)

Michigan (*Mich.*). — (29) What lakes does this state border? Of what advantage is this? (30) What disadvantage can you see in the fact that water separates the lower from the upper peninsula of Michigan? (31) Ice stops lake traffic in winter. What effect must this have? (32) Into what waters does this state drain? Contrast this with the other states. (33) Where are most of the large cities? Why there? (34) For what is each important? (35) Give the reasons for the location of Detroit. (36) What are the important products of Michigan?

Wisconsin (*Wis.*). — (37) Which is the largest city in this state? For what important? (38) What other cities are mentioned in the text? What is done in each? (39) Compare Wisconsin with Michigan in relief; in industries; in mineral products; in crops; in the size of cities. (40) What effect must the lakes have upon the climate? Would this influence be greater or less than in Michigan? Why? (41) If there were coal beds in northern Wisconsin, what effect might it have upon Chicago, Cleveland, and the coal mining of Pennsylvania?

Minnesota (*Minn.*). — (42) Where does the Mississippi River rise? (43) What oceans receive the waters that fall upon Minnesota? Through what rivers? (44) What industries are carried on in this state? (45) What crops are raised? (46) Name the three largest cities, and tell why each is important. (47) How does the largest compare with Boston? With Cincinnati?

Iowa (*Ia.*). — (48) Examine the maps (Figs. 237 to 244) to see what crops are raised in this state. (49) What other important industries are carried on? (50) Name the largest cities. For what noted? (51) Much corn is raised here; what must be done with it?

Missouri (*Mo.*). — (52) Examine Figures 237 to 244 to see how the crops of Missouri differ from those of Minnesota. Why is there this difference? (53) Why are so few towns found in the southwestern part? (54) Name and locate the two

largest cities. For what is each important? (55) What other cities are mentioned? (56) Find the population of St. Louis; compare it with New York, Chicago, Philadelphia, and Boston. (57) Give reasons for its great size.

Kansas (*Kan.*). — (58) Why are the cities confined to the eastern part? (59) What are the industries of the west? Why? (60) What crops are raised in Kansas (Figs. 000 to 000). (61) Name the principal cities. For what is each noted?

Nebraska (*Neb.*). — (62) How do the industries of Nebraska compare with those of Kansas? Why? (63) How are these states alike in regard to location of cities? (64) What cities in Nebraska are mentioned? (65) For what is Omaha noted? Why may we expect it to increase in importance in this respect?

North and South Dakota (*N.D. and S.D.*). — (66) These two states were formerly the *territory* of Dakota. What reason can you see for making two states out of the one territory? (67) How do the industries of the two states compare with those of Nebraska and Kansas? (68) Look at the corn and wheat maps (Figs. 237 and 239) to see where most wheat and corn are produced. Is North Dakota more or less important than Kansas as a corn-producing state? Answer the same for wheat. Tell why this is so. (69) Of what advantage would it be to Fargo if a deep river extended from that city to Duluth? (70) What do the Black Hills contribute to the wealth of South Dakota?

General. — (71) Which state is the largest in this group? (Appendix.) Which smallest? Compare each of these with Mass., R.I., N.Y., N.C., and Tex. (72) Which of the Central States has the most inhabitants? (Appendix.) Which the least? Compare each of these with Mass., R.I., N.Y., N.C., and Tex. (73) Find the ten largest cities (Appendix). How does their total population compare with that of the ten largest in each of the other groups of states?

Suggestions. — (1) Write a brief description of the Western prairies. (2) Find how much earlier in the fall frosts come in Minneapolis than in Memphis. (3) Mention several advantages of farm life over city life. (4) How do farms that you have seen differ from the Illinois farm described in the text? (5) Find other uses of corn besides those mentioned. (6) How does the wind often help ranch cattle to obtain food in winter? (7) What are some of the adventures that cowboys experience? (8) Why are coal and brick especially valuable in a prairie country? (9) Examine a brickyard, and write a description of brick making. (10) See how long a list you can make of articles manufactured partly or wholly out of copper. (11) Do the same in regard to lead. (12) How are the advantages of the location of Chicago somewhat similar to those of Atlanta? (13) Make a drawing of the great water route from Duluth to New York City, and put in the leading cities. What states border on this route? (14) Make a drawing of the Mississippi, Missouri, and Ohio rivers, and include the leading cities. What states do these rivers border or pass through? (15) State clearly the advantages of these water ways. (17) Make a sketch map of the Central States, including principal lakes, rivers, and cities.

For References, see *Teacher's Book*.

Fig. 144.

Compare the relief in this section with that of Figures 48, 68, 96, and 115.

125°
120°
115°
110°
105°
50°
45°
DOMINION OF CANADA
Edmonton
Battleford
N. Saskatchewan R.
S. Saskatchewan R.
Calgary
Regina
Moose Jaw
Lethbridge
Columbia L.
Columbia R.
Kootenai R.
Shuswap L.
Kamloops
Fraser River
Vancouver
New Westminster
Nanaimo
Victoria
Strait of Juan de Fuca
C. Flattery
Port Townsend
Olympic Mts.
Puget Sound
Everett
Seattle
Tacoma
Olympia
Grays Harbor
C. Disappointment
Astoria
Vancouver
Portland
Mt. Hood 11,225
Salem
Albany
Eugene
Roseburg
C. Blanco
Ashland
Klamath L.
Klamath R.
Mt. Shasta 14,880
Coast Ranges
Cascade Mountains
Mt. Rainier 14,526
Columbia R.
Ellensburg
North Yakima
Walla Walla
The Dalles
Pendleton
La Grande
Baker City
Blue Mountains
Deschutes R.
Malheur L.
Warners Lakes
Owyhee R.
Tuscarora
Rossland
Nelson
Spokane
Wallace
Moscow
Lewiston
Pend Oreille
Clark Fk.
Bitter Root Mts.
Salmon
Salmon R.
Snake R.
Weiser
Boise
Hailey
Idaho Falls
Pocatello
Montpelier
Preston
Logan
Shoshone Falls
Snake R.
Kalispell
Flathead L.
Missoula
Helena
Anaconda
Butte
Bozeman
Great Falls
White Sulphur Springs
Billings
Sweet Grass Hills
Ft. Assiniboine
Milk R.
Glasgow
Missouri River
Glendive
Miles City
Yellowstone R.
Big Horn R.
Powder R.
Little Missouri R.
Black Hills
Newcastle
Cheyenne R.
Buffalo
YELLOWSTONE NATIONAL PARK
Yellowstone L.
Fremont Pk. 13,790
Casper
Rawlins
Rock Springs
Laramie
North Platte R.
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
WASHINGTON
OREGON
IDAHO
MONTANA
WYOMING
Rocky Mountains
PACIFIC

FIG. 145.

MAP QUESTIONS. — (1) Compare this group with each of the other sections in relief (Fig. (Appendix). (2) Which is the largest state? The smallest? How does each compare in size with and Texas? (3) What becomes of the water of the Humboldt River? (4) Name the five large

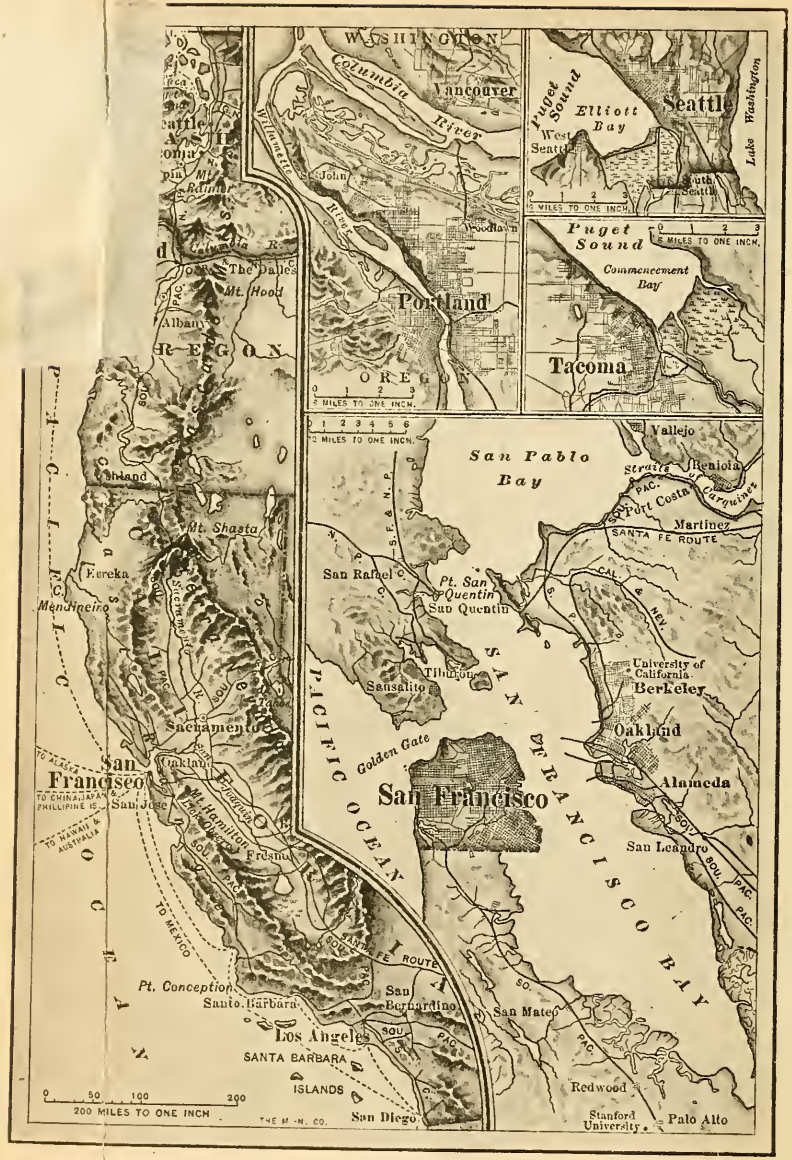


FIG. 146.

Map to show the location of San Francisco, Portland, Tacoma, and Seattle.

IX. THE WESTERN STATES

Early Settlements. — While the pioneers were settling the prairies of the Central States, almost nothing was known about the Far West. The Spanish had taken possession of the Southern portion, and many of their names are still retained, as New Mexico, Los Angeles, and San Francisco. In 1848 gold was discovered in the stream gravels of California, and hundreds of thousands of persons left farms, factories, and homes in a mad rush for the gold fields. Some sailed all the way around South America; others crossed the Isthmus of Panama; but many travelled overland, running the risk of attack from Indians and of death from thirst. There were then no railways west of the Mississippi, and the journey was long and tedious.

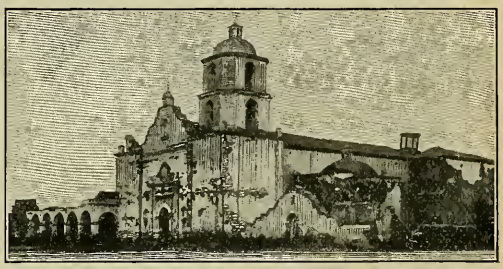


FIG. 147.

A Spanish mission in southern California — a relic of the days when that section belonged to Spain.

For ages the precious metal had lain scattered through the rocks of the Sierra Nevada Mountains. Then, as the mountains slowly crumbled, it had been washed into the streams. Most minerals decay when exposed to the air; but gold always remains bright. Being heavier than most minerals, the gold in the streams dragged along at the bottom, lodging here and there in the stream beds, oftentimes in little pockets or behind boulders where the current was checked.

It was this gold that the early gold hunters, or *prospectors*, were seeking, and they obtained it in a very simple manner. Placing some of the stream gravel in a pan of water (Fig. 253), they rocked it back and forth in such a way as to cause the heavier particles of gold to separate from the gravel, while the lighter minerals were thrown away. The

prospectors were sometimes rewarded by finding large lumps of gold, called *nuggets,* worth hundreds of dollars.

The discovery of gold quickly drew so many persons to California that the territory was able to enter the Union as a state in 1850; and, as the search for the precious metal was carried farther and farther, the West soon became explored and settled. Railways were

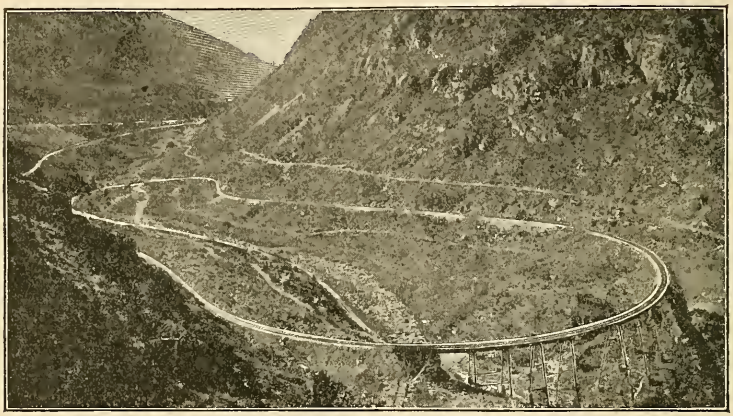


Fig. 148.

A railway winding about as it crosses the Rocky Mountains.

built across the mountains (Fig. 148), and many industries, such as farming, lumbering, and ranching, have followed mining. Indeed, in many sections these industries are now much more important than even gold and silver mining.

Physiography. — The Western States are made up almost entirely of plateaus and mountains. Most of the surface is more than a mile above sea-level, while some mountain peaks are two and three miles in height.

The extreme eastern portion is a continuation of the Great Plains (p. 128), which reach to the very base of the Rocky Mountains. These mountains (Fig. 145) extend entirely across the country into Mexico on the south and Canada on the north. They are made up of a large number of ranges and ridges, which attain their greatest height in Colorado.

A long distance farther west, and almost parallel with the Rockies, is another system of mountains, called the Sierra Nevada Mountains in California and the Cascade Ranges in Oregon and Washington. Still farther west, and close to the coast, is a third series, known as the Coast Ranges, which in places rise directly out of the ocean.

Just west of the Rocky Mountains is a plateau, dotted with numerous mountain peaks and small ridges. It is higher at the two ends than in the middle, and may be divided into three parts (Fig. 45) : (1) the great Columbia plateau of Idaho, Oregon, and Washington on the north ; (2) the Colorada plateau of Arizona and Utah on the south ; and (3) the Great Basin of Utah and Nevada between the two. The numerous short north and south mountain ranges in the Great Basin are called the Basin Ranges.

Between the Sierra Nevada-Cascade system and the Coast Ranges there is an area of lowland (Fig. 144). In California and Oregon this forms a fertile valley ; in Washington it is occupied by Puget Sound.

Throughout most of this Western country evidences of volcanic action abound (p. 6). Some of the loftiest peaks are extinct volcanoes, as Mt. Rainier, within sight of Tacoma, Washington ; Mt. Hood (Fig. 149), not far from Portland, Oregon ; and Mt. Shasta, in northern California.

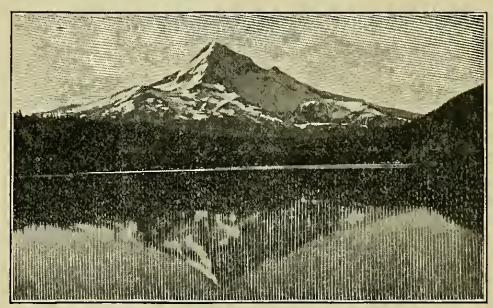


Fig. 149.
Mt. Hood, Oregon.

The influence of lava on the West is marked. For hundreds of thousands of square miles it forms the rock of the country, and through its decay has produced a soil which is very fertile. It covers the plateaus, especially in the north, and is one of the chief causes for the peculiar scenery of the West.

Even more important still is the effect of the lava upon the formation of minerals. Veins of gold and silver usually occupy cracks in the rock which have been caused by the breaking of the strata while the mountains were forming. Through these cracks water passes, heated so hot by contact with the volcanic rocks that it is able to carry mineral matter in solu-

tion. As the water cools, on nearing the surface, it cannot hold all of its mineral burden in solution, and therefore deposits a part of the metal on the walls of these cracks. In this way many valuable veins of metal have been slowly gathered, and it is for these that thousands of miners are now searching.

Climate. — Unlike the East, where the climate is very uniform over large sections, the West is a region of contrasts, with a great variety of climate from place to place. The most general fact about the climate of this vast Western region is its aridity. Nearly everywhere it is so dry that no agriculture is possible without irrigation. Only among the high plateaus and mountains, and in Washington, western Oregon, and northern California, is there rainfall enough for forests or for farming. Thus, almost one-fifth of the entire continent is a partial or complete desert.

FIG. 150.
Some of the giant trees that grow in the rainy Northwest.

Along the northwestern coast the damp west winds bring so much vapor that the rainfall is heavy. Indeed, near the coast of Washington there is a rainfall greater than in any other part of the United States (Fig. 304), the heaviest rain coming in winter. But being robbed of its vapor in crossing the mountains, the air descends on the eastern side so dry that agriculture is possible only in a few sections, as in the high mountain valleys and in the wheat district of central and eastern Washington.

A part of Nevada, Utah, and Arizona is a true desert, and portions of each of the other states approach it. Near the northern shores of Great Salt Lake, for example, not a tree nor even a shrub is to be seen for miles and miles. The entire surface is covered by a glistening whitish substance called *alkali*. In other regions dreary wastes extend hundreds of miles, interrupted

only by a few cacti and other arid land plants, by rocky ledges, and by occasional mountain peaks.

The lack of water is shown on the map by the scarcity of streams in and near Nevada. That section is a real basin, having a rim higher than the centre, and is called the *Great Basin* (Fig. 45). Its few streams either flow into shallow salt lakes, which are growing more and more salt as the years pass, or they dry up and disappear in the sand.

That rain falls on the cool mountains and plateaus of the West is proved by the numerous large rivers which have their sources there. Name and locate those flowing from the Rocky Mountains into the Mississippi. Trace the Rio Grande and the rivers that empty into the Pacific Ocean. Although long, these rivers are not navigable, partly because of the steep slopes, and partly because of the lack of water. Indeed, during the dry summer season, many, like the Rio Grande, almost disappear in the middle part of their course.

The importance of even the higher plateaus in condensing the vapor is well illustrated by the highlands of Central Arizona. A person travelling eastward from Los Angeles, on the Atchison, Topeka and Sante Fe Railway, upon reaching the Colorado River in the evening, finds himself in the midst of a desert about 500 feet above sea-level. If it is summer, the thermometer may register from 110° to 120° in the shade, for this is the hottest region in the United States, hotter than many parts of the torrid zone. After leaving the river, the train ascends the Colorado plateau, 7000 feet high, and the next morning the traveller is in the midst of a forest, while the almost unbearable heat of the previous day is replaced by a delightfully cool air. As if by magic the scene is changed, simply because, on the elevated plateau, the air is cooler and the vapor can therefore be condensed into rain.

Mineral Products. — As we have already seen, mining was the first industry to attract large numbers of pioneers to the Far West. Every one of the Western States contains mineral deposits of some kind, as gold, silver, copper, lead, mercury, and coal. This region is now the most important mining district in the world.

Much of the land is still owned by the government, and all ore that is discovered upon it belongs to the finder. Any citizen of the

United States may become the owner of a valuable mine, if he can find one on government land. Consequently, hundreds of prospectors are digging tunnels into the earth wherever they believe they may obtain ore. In most cases they are doomed to disappointment, but they keep trying, moving from place to place. Sometimes, however, valuable ore is found, and then the poor prospectors become suddenly rich.

Much gold has been discovered in the gravels of stream beds where water no longer flows. In many places these dry beds are near the surface, so that mining is easy; in others, they have been covered up by a thick blanket of hard lava, beneath which the miners are obliged to tunnel in order to follow them.

Very early the miners became dissatisfied with the slow "panning" of the gold, as washing the gravel in pans was called

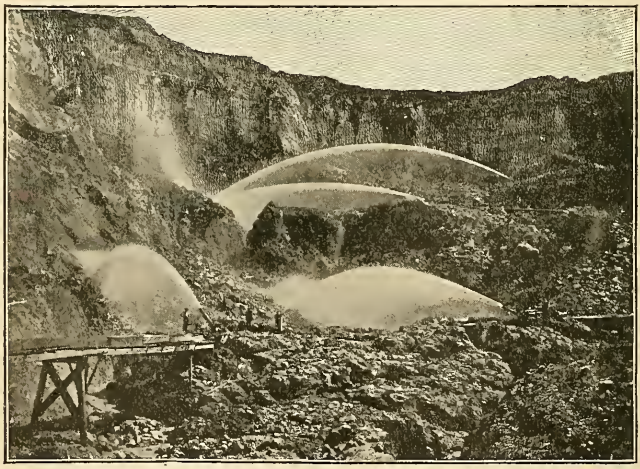


Fig. 151.
Washing gold from gravel beds in California by means of hydraulic mining.

(p. 149). They then adopted the far more speedy plan of *hydraulic mining*. By this method a powerful stream of water is turned against a gravel bank from the nozzle of a pipe, washing the gravel rapidly away (Fig. 151). The water, gravel, and gold are led into steeply sloping troughs, or *sluices*, which have numerous little bars of

wood, called *riffles*, across their bottom. The water, with its load of gravel, rushes over the riffles to the end of the sluices, where the coarser gravel is dropped; but the gold, being so heavy, settles to the bottom of the sluices and is caught behind the riffles, where it is later collected.

Much gold has been obtained from the gravels of other western states than California. For example, even the gravel out of which some of the streets of HELENA, Montana, are built has been washed for gold.

Another method of mining gold, and the one by which most of that metal is now obtained, is to dig into the solid rock. The shafts and tunnels follow the veins from which the gold in the gravels originally came. In the veins, the metal is found in rock mixed with other minerals which are of little or no value; but the gold occurs in such small grains that one may spend days in a mine looking for it, without *seeing* any.

One of the most remarkable mining districts in the world was that of the Comstock Lode at VIRGINIA CITY, Nevada. The vein was irregular in richness, some parts, called "bonanzas," containing so much gold and silver that vast quantities were taken out, while elsewhere it was much more barren. So much metal was obtained from this single vein that Nevada at one time produced more silver than all the other states put together, and more gold than any other state in the Union. So many people moved there then that Nevada territory became a state in 1864; and VIRGINIA CITY, though in the midst of the desert, grew to be a thriving city.

FIG. 152.
A western stage coach bringing a crowd of miners into a newly discovered mining camp, as miners were carried into Cripple Creek a few years ago.

As the mines went deeper, hot water with a temperature of 170° entered. This caused the temperature in the mines to be almost unbearable. Ice-cold air was forced in, and machinery and mules were made to

do most of the work; but even then men fainted at their posts Partly because of the difficulty of mining, and partly because of the failure to discover new bonanzas, some of the mines were abandoned and people drifted away from Virginia City, so that the population of Nevada decreased. What is its present population? (Appendix.) Compare it with New York City in population (Appendix). With the large city nearest to your home.

At the present time Colorado produces more gold and silver than any other state (Figs. 253 and 254), and much copper, lead, iron, and coal, besides. Among the mountains, one sees mines almost everywhere; but one of the most noted mining districts is near LEADVILLE, a city at an elevation of over 10,000 feet above sea-level. Another well-known mining camp in Colorado is CRIPPLE CREEK. A few years ago no town existed there, and the ore, which has now become so valuable, was not recognized as ore by the prospectors. Finally, when some one discovered the gold, at once, as in previous cases where that metal has been discovered, thousands of people rushed in from all directions and a city sprang up almost in a day.

After the ore is taken from the mines it must be crushed, the worthless parts must be washed out, and the remainder sent to the *smelters*

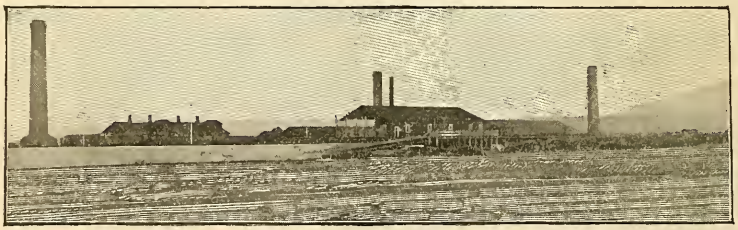


FIG. 153.
A smelter at Great Falls, Montana.

(Fig. 153), where the metal is obtained by a complicated process. The machinery for crushing and smelting is so expensive that ores from many mines are sent to one place, and must sometimes be carried a long distance. The mines near LEADVILLE send their ore to that city; but many mines in Colorado ship ore to the smelters at DENVER and PUEBLO.

The western half of Montana is another great mining section. HELENA has already been mentioned (p. 155); but no portion of the state is now so important for mining as BUTTE. There the principal metal is copper, although some gold and silver are mixed with the ore. More copper is produced at Butte than in any other mining district in the world. The mines are very extensive, reaching several thousand feet into the earth and having miles of tunnels, through which one might wander for days without finding his way out.

Much of the ore is crushed and reduced in smelters within the city limits. In the process, fumes of sulphur pour forth from the tall chimneys, and settle to the ground, killing almost all vegetation, and causing the city and its immediate surroundings to present a barren, desolate appearance.

As in Colorado and Montana, the principal industry in Arizona is mining, much copper, silver, lead, and gold being produced. One of the largest cities in the territory is TUCSON, which, together with the others, is mainly engaged in business connected with mining. There is also much mining, especially of gold, silver, and copper, in each of the other Western States, especially in Idaho, Utah, and New Mexico.

Iron is found in several of the states, but it is not mined to any extent excepting west of PUEBLO, in Colorado. Coal, usually of poor quality, also occurs in many sections; but a very good grade of coal is produced in Colorado, and in the state of Washington.

Lumbering. — Because of the extensive development of mining there is much lumbering. The Butte mines alone consume millions of feet per year. In the mines heavy timbers are placed upright and close together on each side of a tunnel, with crosspieces overhead, to prevent the rock from caving in. Because of the great pressure upon them, timbers more than a foot in diameter are often broken.

While a great portion of the country is arid, the mountains and some of the higher plateaus are forested. Thus the mines, which are usually among the high mountains, are generally supplied without difficulty, for the logs are easily brought down to them from above.

In the damp, equable climate near the northwestern coast, are forests of giant redwood, fir, cedar, and spruce trees which grow to a greater size than any other trees in the world (Figs. 150 and 155). While the logs in Maine and Michigan are rarely more than two or three feet in diameter, many in Washington and Oregon are from six to ten feet through, and some in California are very much larger.

FIG. 154.

Chopping down a tree in Washington. The men stand on platforms so as to reach above the decayed wood near the base.

A visit to a lumbering camp near Tacoma will show that, owing to the size of the trees, and to the climate, the work is carried on very differently from lumbering in Maine (p. 46). The men are able to work both winter and summer. They select a tree which perhaps towers upward for two hundred feet, — that is higher than most church steeples, — and contains as much as fifteen thousand feet of lumber, or enough, when sawed into boards, to build a small house. Two men saw and chop at this tree for nearly an hour (Fig. 154), until the giant begins to quiver. When finally it falls, a

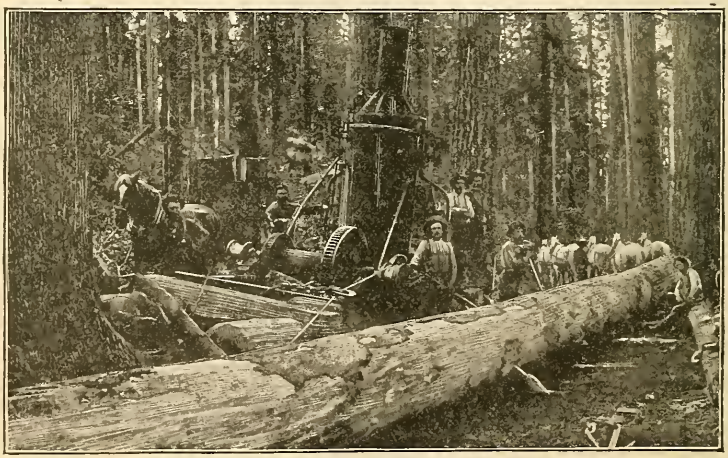


FIG. 155.

One of the great logs ready to be removed from the forest in Washington. A small engine, used to draw the logs to the railway, is also shown.

wonderful sight may be seen. The tree bends slowly over, quickens its movement, then falls to the ground with a mighty roar, breaking good-sized trees, against which it falls, as if they were twigs.

After the branches are removed, the tree is sawed into logs of different lengths, as twenty-four, thirty-two, forty-eight feet, and these are dragged to a railway which leads up into the forest. Several of these sections are then fastened together, one behind the other, and dragged between the rails to the foot of the mountain several miles away. There they are piled upon flat cars and taken to the mills, a single section sometimes occupying an entire car. Many go to TACOMA and SEATTLE, where there are enormous sawmills. Since there is so much lumber, many of the streets of Tacoma, and other places in this region, are paved with thick planks instead of stone or asphalt.

FIG. 156.

Harvesting wheat in the great wheat fields of the Palouse region of Washington. By this machine, drawn by many mules, the wheat is both cut and the seed removed at the same time. A farm must be very large to make such an expensive machine pay.

Agriculture. — Farming is carried on extensively in the well-watered section of the Northwest (Fig. 156). This is a wheat-producing country like the Red River valley. Indeed, some of the farms are even larger than the Dalrymple farm (p. 126). Barley is another common grain and much hay is also raised. During harvest season the air is so dry that both hay and grain may be left out for weeks with little danger of being spoiled by rain.

Great quantities of fruit are also raised in this region. In the north apples, pears, and grapes are produced; but in the south, as for instance near STOCKTON, and SACRAMENTO, the capital of California, are groves of oranges, lemons, olives, and figs, as well as other trees which grow only in warm climates.

But the only way in which farming is possible in most other parts

of the West is by means of irrigation (Fig. 158). The influence of irrigation is well illustrated in the region near DENVER, which is in the midst of an arid plain. This is crossed, however, by the South Fork of the Platte River, from which a ditch as large as a canal is led out upon the plain. The river itself has a rapid fall; but just enough slope has been given to the ditch to secure a flow of the water. By this means the land between the ditch and the river is at a lower level than the ditch, and may therefore be reached by the water.

Smaller branches are led off from the main ditch, and each of these is divided and subdivided to supply farms along its course. When a field needs water, the ditch is tapped and the field flooded, or else the water is led into little furrows a few feet apart. The method followed depends upon the kind of crop that is under cultivation. As there is danger that the supply of water may not last through the summer, reservoirs (Fig. 157) are built to store the water furnished by the spring freshets; and when needed, this is allowed to flow into the ditch.

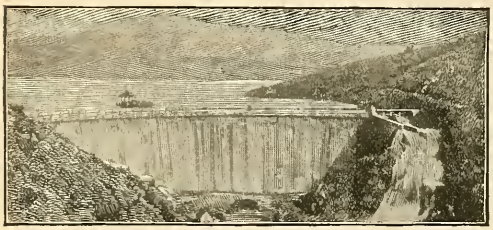


FIG. 157.
A reservoir for irrigation near San Diego, California.

Of course such an arrangement is expensive, and each farmer must pay for his water at a certain rate, as each house in a city pays for its water or gas. That one can afford to do so is well shown in this case; for on the upper side of the ditch, which cannot be reached by the water, the land is fit only for grazing, while the land which can be irrigated is covered with cultivated fields of grain, vegetables, and alfalfa. The latter is a very nutritious plant which, like clover and hay, is fed to stock.

Without irrigation, crops could not be grown in this vicinity, but would need to be brought several hundred miles, from Kansas, Nebraska, and other states. It is evident, therefore, that irrigation must have had a great influence on the settlement of the West. Without it DENVER and PUEBLO would not be the cities that they

are ; and, because of the difficulty of obtaining food, scores of mining towns would not be in existence.

Wherever the waters of the rivers are led out over the fields, people form settlements and often small cities. That is the case at GREELEY, Colorado, CHEYENNE and LARAMIE, the principal cities in Wyoming, and numerous other places.

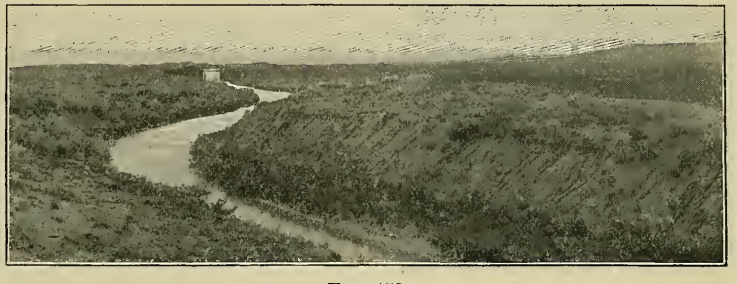


FIG. 158.
An irrigation ditch on the plains near Billings, Montana.

One of the best farming districts in the arid lands is in Utah. Most of that state was originally almost a desert, but large areas have been entirely changed by the Mormons, a religious sect organized by Joseph Smith in New York in 1830.

Under the leadership of Brigham Young these people migrated into the then unknown West and settled a few miles from Great Salt Lake. There they commenced to build SALT LAKE CITY, which is now one of the most beautiful cities in the country. They also began to raise crops by irrigation, to plant fruit trees, and to convert portions of the desert waste into beautiful gardens.

There are now many "gentiles" as those among them who do not accept Mormonism are called; and agriculture is no longer the sole industry, for many rich mines, especially of gold, silver, and copper, have been opened. There are numerous busy towns and cities, the largest, aside from the capital, SALT LAKE CITY, being OGDEN, which lies north of the capital.

Southern California is a third section noted for its extensive irrigation. The mountains of the neighborhood condense the vapor, and the water is led into long irrigating ditches and stored in immense reservoirs (Fig. 157). The region is far south and its shores are bathed by warm ocean waters, so that the climate is warm and delightful. Although the land is by nature almost a desert, the

addition of water to the fertile soil has changed the country about Los Angeles to one of the garden spots of the world. This region produces oranges, lemons, peaches, pears, grapes, figs, olives, walnuts, almonds, and many other kinds of fruits and nuts.

Fig. 159.

An orange grove near Los Angeles. Notice the snow-capped mountains in the background from which water for irrigation is obtained.

Among the fruits the most common is the orange, especially the seedless navel orange. In the neighborhood of Los Angeles every home has its orange trees, and in many cases is entirely surrounded by groves of them. The winter season is the harvest time for oranges, which begin to be picked from the trees about the middle of November and continue to be gathered until February or later. They are cut from the trees, sorted according to size, then packed in boxes and shipped away.

The groves of all kinds are planted in straight rows, and the ground is kept so clean by frequent ploughing that scarcely a weed is to be seen. In this respect the groves contrast very strikingly with the orchards, overgrown with grass and weeds, that are seen upon farms of the East.

Besides fruit in the fresh state, immense quantities of fruit, such as peaches, prunes, apricots, grapes (Fig. 161), and figs, are dried, usually by exposure to the sun. In the Eastern States fruit would decay if left out of doors; but in the sunny climate of the arid lands it dries quickly. Great quantities of fruit are also canned, as near Baltimore and elsewhere in the East.

Fig. 160.

Picking oranges near Los Angeles.

Thousands of persons from the East were originally attracted to southern California by the mild climate; but seeing the opportunity

for fruit raising, they started orange groves. As a result of this, Los Angeles has rapidly grown to a city of more than a hundred thousand inhabitants (Fig. 172), while near by are numerous smaller cities. Land that a few years ago was almost a desert, and worth at best only a few dollars an acre, now supports flourishing groves of fruit.

So important is irrigation that it is being introduced wherever possible; and every year new irrigation systems are being built, some of them at great expense. One of the future problems of the West is how to store the water of the melting snows until needed by the summer crops.

Fig. 161.
Raisins drying between the rows of grape vines in a California vineyard.

Ranching. — There is so little rainfall in the arid West that only a part of the land can be irrigated. This leaves most of the country

Fig. 162.
A herd of sheep in winter, feeding in a field of alfalfa near Billings, Montana.

suited only to grazing; and wherever there is water enough for the animals to drink, cattle, horse, and sheep ranches are found. In some parts, especially where the grass is scanty, herds of goats are raised.

The manner in which a cattle ranch in Dakota is conducted was described on page 128, and much the same plan is followed for cattle and horses in the Western States. Sheep ranching is conducted somewhat differently, as can be seen from the ranches about Billings, Montana. A good-sized ranch has from twenty-five thousand to forty thousand head of sheep, which, like cattle, may be fed partly upon the government land, or the "range," and partly on land fenced in and owned by the ranchman. During the coldest winter weather the sheep are in many cases driven into protected *corrals* and fed on alfalfa (Fig. 162), because the snow on the range sometimes becomes so deep that they cannot obtain food. However, the fierce winds of the open plains help them by drifting the snow and thus leaving open patches where they can find grass.

Fig. 163.

A sheep herder, and his flock of sheep.

When the sheep are feeding on the range one man with a dog (Fig. 163) can herd twenty-five hundred; and, with a horse in addition, he sometimes takes care of five thousand. Selecting some spot near water for a camp, the herder drives his sheep out each morning and back at night, going each day a distance of a mile or two from camp. When the grass is eaten in one place, the camp is moved; then, from another point as a centre, they wander out as before.

The life of the herder is extremely lonesome, both day and night being spent with the sheep. Once a week a man comes to bring him food; and for weeks, and even months at a time, that is the only company he has, aside from his sheep, his dog, and possibly his horse.

After the winter is over, the first profit to the ranchman comes from the sale of the pelts of sheep which have died during the cold weather. He expects a loss of about five per cent a year from this cause; and wolves also take some.

The next harvest comes from the wool. Men who make it their business to shear sheep travel in squads of about twenty-five. They erect sheds and pens near some sheep centre, such as Billings, and shear all the sheep that are brought to them. Sometimes sheep are sheared at the ranch; but many consider it more desirable to drive them near to a market, thus saving the expense of drawing the wool a long distance to the rail-

Fig. 164.

A load of wool, drawn by twelve oxen, entering Billings after a long journey from a distant ranch.

way station (Fig. 164). In this way the sheep also secure food on the range while on the journey to and from the market.

In the Southwestern States sheep are often sheared twice a year; but further north it is done only once, and then as near the month of June as possible. Can you suggest a reason for choosing that time? After the wool is cut, it is pressed into bales and shipped to various markets in the East. Where should you think it might be sent, and for what purpose used?

From July on, many sheep are sold for mutton. Those that are from three to five years old, and that have already borne a quantity of wool, are usually selected for this purpose. The hides are useful for leather, the bones for fertilizing the soil, and the tallow for candles.

Territories. — Arizona and New Mexico are still territories, although Arizona has twice as many inhabitants as the state of Nevada, and New Mexico nearly four times as many.

FIG. 165.

A Navajo Indian girl and one of the blankets woven by these Indians.

This is the region in which some of the most highly developed Indians were discovered by the Spaniards (p. 28), and here some of their descendants still occupy reservations. However, most of the country is now occupied by Americans and Mexicans, who have formed numerous towns and cities, such as ALBUQUERQUE, the largest city in New Mexico.

The Pueblo Indians are especially interesting, for some of them still live after the manner of their ancestors. Their homes are built of sun-dried clay, or *adobe*, and in some cases are entered from the roof by means of a ladder (Fig. 30). They were intended as strongholds for the storing of grain and for protection against wandering tribes which might attack them at any time. Other Indian houses, the *cliff-dwellings* (Fig. 166). were built on the sides of cliffs beneath overhanging ledges; and still others, *cave-dwellings*, were in caves dug out of the rocks by the Indians.

FIG. 166.

Cliff-dwellings, built in caves beneath the overhanging cliffs.

Among the early Spanish settlements is the quaint city of SANTA FÉ, the capital of New Mexico. There, as elsewhere in the territory, the houses are mostly low, one-story, adobe buildings (Fig. 167). Spanish is the language most commonly heard, and on all hands one sees the primitive customs of a century ago. For instance, wheat, instead of being threshed out by machines, is often spread upon the ground in an enclosure and tramped by goats until the grain is separated from the hull. The grain is then tossed into the air in order

that the wind may carry away the chaff. However, in many parts of New Mexico and Arizona, mining and other industries are well developed, and there are many American residents.

Fig. 167.
A view in a New Mexico town, showing the low adobe houses in which the Mexicans live.

Scenery

In many places among the mountains there are sights comparing favorably with those of the Alps, which attract so many Americans abroad. Fine views, strangely formed cliffs, deep canyons, and imposing waterfalls are present without number. But among all the interesting places there are three that easily surpass the others in magnificance and grandeur. These are the Yellowstone National Park, the Colorado Canyon, and the Yosemite Valley.

The Yellowstone Park. — This region, chiefly in Wyoming, is a tract of land, larger than Connecticut, which the government has set aside as a national park. It is often called the "Wonderland of America." Among the many objects of interest are boiling springs, boiling mud springs of different colors, deep canyons, and waterfalls. Some of the springs are on the level of the ground, so that one must be on the constant outlook lest he step into one; others are surrounded by a rim several feet high.

A stage road leads from the Northern Pacific Railway to the Mammoth Hot Springs on the northern side of the Park. There, from openings in the hillside, heated water flows down over beautifully colored terraces which have been built by a deposit of mineral matter brought by the water. Farther on are boiling springs, and here and there is one, called a *geyser*, from which hot water and steam occasionally burst forth with great violence, sometimes to a height of 100 or 200 feet (Fig. 168). "Old Faithful," one of the most regular of these, plays at intervals of 65 minutes, to a height of 100 to 130 feet. Others discharge at much longer periods, as two to three hours, or several days; and in some cases the roar of escaping steam lasts for hours after the water has all been expelled.

The outbursts are really explosions of steam, the heat being supplied from deep in the earth.

Beyond the geyser basins the Yellowstone Lake is reached, a beautiful sheet of water, nestled in the mountains at a height of nearly 8000 feet above the sea. Its waters flow northward, forming the Yellowstone River, a tributary of the Missouri. To many persons, the falls and canyon of this river are the greatest wonders of the Park. Soon after leaving the lake, the stream narrows and quickens, and the water leaps 109 feet directly downward. A short distance farther on it tumbles 308 feet farther, or almost twice the height of Niagara. It then runs between banks which extend 1000 feet above it.

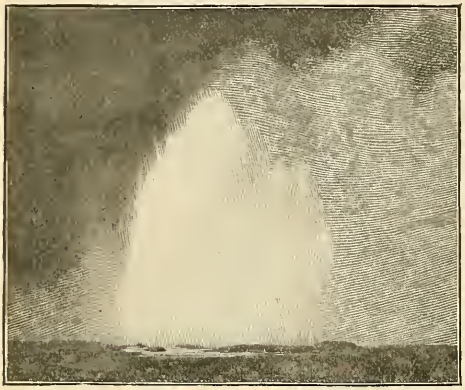


FIG. 168.

An eruption of one of the geysers of the Yellowstone Park.

The canyon is somewhat winding, with numerous bold cliffs jutting far out into the abyss; and from these, wonderful and inspiring views may be obtained. Far below, one sees the silvery stream, too distant to be heard as it dashes along. Across the chasm, a half mile away, dark green pines fringe the bank; and between the water and these woods are gorgeously colored rock strata, having all colors of the rainbow.

Colorado Canyon. — One portion of the Colorado Canyon, in Arizona, may be reached on the Atchison, Topeka and Santa Fé Railway. The wonderful Yellowstone Canyon, just described, is a pygmy compared with this (Fig. 7).

As one first looks out over the canyon he sees nothing but towers, pinnacles, many-colored layers of rock, and apparently bottomless depths. When he finally takes a position from which the thread-like stream below can be spied in the abyss, it seems almost impossible that so little water could have wrought such mighty havoc.

The difficult path which leads to the bottom is seven miles long, and the trip down and back is a full day's journey; but without making it, one fails to appreciate fully the marvellous carving,

sculpturing, and coloring. At the bottom the scene is entirely changed; and, as one looks upward to see himself shut in by walls which seem to extend to the very heavens, his own littleness and the immensity of the work of Nature are wonderfully impressed upon him.

For three hundred miles the river flows at the bottom of this deeply cut canyon, and hence serves as a very complete barrier to travellers. A

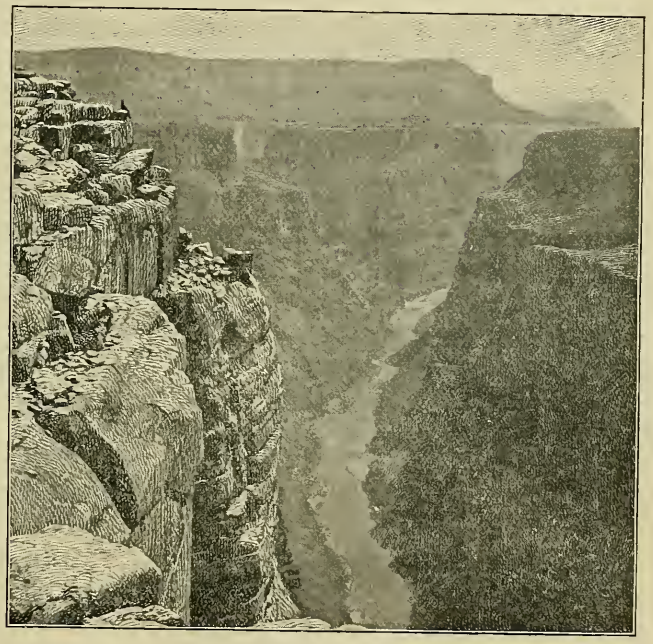


FIG. 169.
A view in the Colorado Canyon.

person living on one side, where he could look across to the other side, ten miles away, would need to travel hundreds of miles to reach that side; for there are no railways or roads leading across.

Yosemite Valley. — This wonderful valley, on the western slope of the Sierra Nevada Mountains, in California, presents very different views from those already described. Some of the most magnificent are formed by the Yosemite River, which pours over a precipice into the valley below. In one mighty leap the water descends 1500 feet, forming the

Yosemite Falls, which are famed the world over. Below this are some cascades, then another fall of 400 feet.

Near the fall are seen the giant trees of the world, the largest of which is 31 feet in diameter.

The Cities

Cities in the Interior. — Large inland cities in the Western States are very few in number, the greatest being Denver, the capital of Colorado. This city is located on the site of a small mining camp; but its growth is chiefly due to two facts: (1) the numerous mining towns among the mountains, and (2) the near presence of water, which has made irrigation on a large scale possible (p. 161). The first fact calls for an important trade centre somewhere in that region, and the second makes it possible to secure food.

Denver has now become a railway and manufacturing centre, where ore is smelted, and machinery, flour, and cloth manufactured. It is also of importance as a health resort, for its altitude of over five thousand feet, and its dry climate, render it especially adapted to persons suffering from lung trouble. Colorado Springs, south of Denver and near Pike's Peak, is one of the leading health resorts in the country.

Pueblo, a trade and manufacturing centre, is situated where the Santa Fé line meets the Denver and Rio Grande Railway. In this city much ore is smelted, and iron goods are manufactured. It is its nearness to coal and iron ore which makes the latter industry possible.

A number of interior cities, such as Salt Lake City, Ogden, and Butte, have already been mentioned (pp. 157 and 161). Name some others. None of the other inland towns in these states are very large, and whatever importance they have is due chiefly to mining, farming by irrigation, and grazing.

Cities on the Pacific Slope. — The largest city in all these states is San Francisco (Fig. 146), located on a remarkably fine harbor which was formed by the sinking of the coast, as the harbor of New York City was formed. As in that case, too, there are other important cities near at hand — the largest being Oakland. Close to San Francisco are the two most important educational institutions in the Far West, — one, the University of California, at Berkeley

(Fig. 146), the other Leland Stanford Junior University, a short distance south of San Francisco. Farther south is SAN JOSÉ, and to the northeast is SACRAMENTO, the capital.

The enormous crops of wheat, fruit, and wool in northern California suggest some of the occupations in these cities. What are they? Owing partly to an insufficient supply of coal, manufacturing is not so extensively developed as might be expected. One sees the effect of this lack of coal on the railways, for wood is a common fuel on the engines in Oregon and northern California, while in southern California steam is often generated by the use of petroleum, obtained from the oil wells of LOS ANGELES and vicinity. It is not surprising, then, that most of the wool raised in the West is shipped to the East to be manufactured into clothing, blankets, etc., even though some of these articles must be sent to California to be sold.

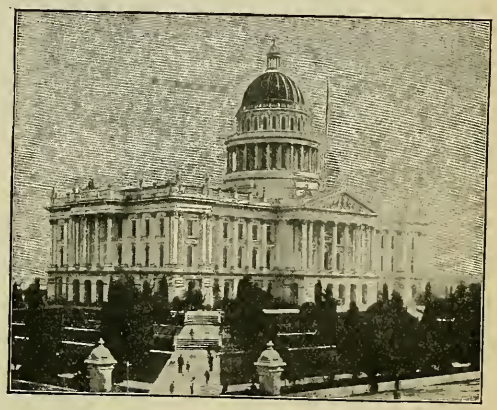


FIG. 170.
The capitol building at Sacramento, one of the most beautiful state capitols in the country.

Nevertheless, San Francisco has founderies and machine shops, flour and woollen mills, sugar refineries, canning factories, breweries, and distilleries. The principal products sent away from the state are gold and silver, wine, fruit, wool, and grain, some going East by rail and some by water. This is the greatest shipping point on the Pacific coast; and, as our trade with the Philippines, Hawaiian Islands, and other Pacific countries increases, we may expect San Francisco to grow even more rapidly.

An interesting portion of this city is the section called "Chinatown" (Fig. 171). Chinese are very common in some parts of the West; and since, for a long time, San Francisco was their chief landing place, many thousands have collected there, living huddled together in hovels, almost like rats.

Owing to the fact that mountains rise almost from the sea, there are few harbors on the west coast; and those that are found are at places where, in the course of mountain growth, the land has been lowered. The next important harbor south of San Francisco is the port of Los Angeles, twenty miles from Los Angeles itself. A still better one, however, is still farther south at San Diego. Estimate the distance of these points from San Francisco (Fig. 146).

Fig. 171.
A scene in "Chinatown" in San Francisco.

The first good harbor north of San Francisco is that of Portland (Fig. 146) on a small tributary of the Columbia river. Like New Orleans, it is situated about a hundred miles up the river near the head of deep water navigation. Since harbors are lacking, most of the other important towns of Oregon are inland, and Portland has grown to be the chief shipping point by water, and therefore the largest city. From this point wheat, wool, and lumber, the leading products of Oregon, are shipped in great quantities. Portland has extensive manufactories of woollen goods, flour, and furniture; and Salem, the capital, also has large woollen and flour mills.

Fig. 172.
A street in Los Angeles.

Farther down the Columbia are several towns, the largest being Astoria, where, as elsewhere along the river, the salmon industry is

developed. The salmon, like the shad of the East (p. 71), although spending its life in the ocean, passes up the rivers to *spawn*, or lay its eggs, in fresh water. In their passage the fish are caught in great numbers (Figs. 173 and 174), and some are shipped away in ice, even across the continent to Eastern cities. Others are sent to the numerous canning factories along the lower Columbia where they are cooked and packed in cans (see also pp. 199–200).

FIG. 173.

Catching salmon in dip nets as they leap over the falls on their way to the waters where they spawn.

Washington, unlike Oregon, has many fine harbors. On two of these SEATTLE and TACOMA (Fig. 146) are situated; but SPOKANE, the third city in size, is located near some falls of the Spokane River in the eastern part of the state. Coal, lumber, grain, and hops are the principal exports. There is also extensive manufacture of flour at Spokane, and of lumber and furniture along the shores of Puget Sound, especially at Seattle and Tacoma. These goods are shipped away in large amounts, some going to the Eastern cities, some to China, Japan, the Philippines, Alaska, and other countries.

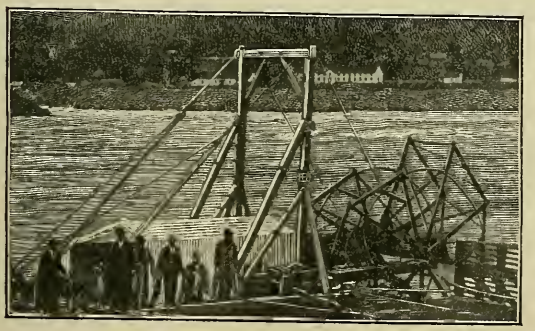


FIG. 174.

A wheel, with a net on it, which revolves in the current and lifts the salmon from the water as they swim past.

On Figure 255 notice what great lines of railway cross the continent to the Pacific coast, and in what cities they terminate. What about the number of railways on the Pacific coast compared with those on the Atlantic?

QUESTIONS AND SUGGESTIONS

Review Questions and Topics. — (1) Tell how California became settled. (2) How did gold get into the streams? (3) How did the prospectors obtain it? (4) Describe the physiography: — the mountains and plateaus; the volcanoes; their effects. (5) Tell about the climate: — the aridity; the rainy Northwest; the deserts; the effect of plateaus and mountains. (6) What minerals are found in the West? (7) Tell about the prospectors. (8) Describe hydraulic mining. (9) What kind of gold mining is now most common? (10) Give the history of the Comstock Lode. (11) What effect did it have upon Nevada? (12) What state now produces most gold and silver? (13) Name and locate the principal mining towns in Colorado. (14) What must be done with the ore? Where is it done? (15) Name and locate the principal mining town in Montana. (16) In Arizona. (17) Where is copper found in these states? (18) Where is coal chiefly found? (19) Where are the forests? Why? (20) Describe lumbering near Tacoma. (21) What are the farm products of the sections that are well supplied with rain? (22) State the plan for irrigating the land near Denver. (23) Tell how irrigation has influenced the settlement of the West. (24) Name some cities that have irrigation systems. (25) Tell about the Mormons. (26) Describe the fruit region of southern California: — the appearance of the country; the climate; the products; what is done with them; the cities; the importance of water. (27) Why is ranching carried on in the West? What animals are raised? (28) Tell about sheep ranching: — number of sheep; care given them; shearing; uses of the products. (29) Tell about the Indians of New Mexico and Arizona. (30) About the primitive customs of the Mexicans. (31) Describe the Yellowstone Park: — location; size; springs and geysers; the canyon. (32) Describe the Colorado canyon. (33) The Yosemite Park. (34) Name the principal inland cities, telling for what each is important. (35) What cities are on or near San Francisco Bay? For what important? (36) Tell about San Francisco. (37) Name the harbors south of San Francisco. (38) Describe the location and industries of Portland. (39) What is done at Salem? (40) Tell about the salmon industry. (41) Name the cities of Washington. For what is each important?

Review by States: *Montana* (*Mont.*). — (1) What industries are carried on in the eastern part? Why? (2) What industries in the western part? (3) Name the cities mentioned in Montana, and tell for what each is important. (4) What two large rivers drain this section? (5) Through what states do they flow before reaching the Gulf? (6) Draw an outline map of the state; and, as each of the other states is studied, do the same for it.

Wyoming (*Wy.*). — (7) What industries are carried on in this state? (8) What cities are mentioned? In what connection? (9) Find the Yellowstone Park, and tell for what it is noted. (10) On the maps showing principal grain-producing regions (Figs. 237 and 239), Wyoming is a state where very little is produced. Why so little there?

Colorado (*Col. or Colo.*). — (11) Examine Figures 237 to 252 to see what is done in Colorado. (12) Give the reason why there is more water for irrigation in this state than in some of the others. (13) Trace the divide between the

Pacific and Atlantic drainage, as it crosses Colorado. Trace it northward to Canada and southward to Mexico. (14) Name the cities in Colorado mentioned in the text, and tell for what each is important. (15) Find the population of Denver (Appendix). Compare it with the largest city in each of the other Western States, and also with New Orleans, Buffalo, and St. Louis.

New Mexico (*N.M.*). — (16) What about the inhabitants? (17) What is said about the industries? (18) Find how large the largest city is (Appendix). (19) Compare it with the largest city in Massachusetts. In Nevada.

Arizona (*Ariz.*). — (20) Tell about the river which crosses the territory. (21) What city and industries are mentioned? (22) What minerals are obtained here? (23) How does the largest city compare in size with the largest in New Mexico? In Colorado?

Nevada (*Nev.*). — (24) For what was Nevada famous? (25) Find its present population (Appendix). Why are there so few people?

Utah. — (26) Tell why the Great Salt Lake is salt (see First Book, p. 55). (27) What are the industries of this state? (28) What cities are mentioned? Tell about each. (29) Examine the maps, Figures 237 to 252, to see what products come from Utah.

Idaho (*Ida.*). — (30) What metals are obtained? (See Figs. 252 and 254.) (31) What great river drains Idaho? (32) What mountain range forms the eastern boundary?

Washington (*Wash.*). — (33) Compare the coast line with that of Oregon; of Maine. (34) Tell about the rainfall of this state. Compare it with Montana (Fig. 304). Why this difference? (35) What effect has the rainfall upon the industries? What are the principal industries? (36) What cities are mentioned in the text? Tell about each.

Oregon (*Ore.*). — (37) What advantage do you see in the location of the largest city? (38) Compare it in size with Denver, New York, Boston, and New Orleans. (39) Examine the maps (Figs. 237 to 252) to see what is produced in Oregon. (40) What industries are mentioned in the text? (41) What cities are mentioned and in what connection?

California (*Cal.*). — (42) What about the rainfall? (43) What rivers drain most of this state? (44) Describe the relief. (45) Name the cities mentioned; for what is each important? (46) What industries in the state? (47) What advantage do you see in the location of San Francisco? (48) Compare its population with that of Boston, New Orleans, Denver, and Chicago. (49) What caused the early growth of California? What effect has that had on the other Western States? (50) To whom did California belong before we obtained it?

General. — (51) Which state has the largest population? (See Appendix.) The smallest? (52) Compare each with Massachusetts, Rhode Island, New York, and South Carolina. (53) Name the ten largest cities (Appendix). Add their populations together, and compare the result with the ten largest in each of the other groups. (54) Which group of states has the most large cities? Which the least? What reasons can you give?

Suggestions. — (1) Read about the expedition of Lewis and Clark from St. Louis to the Pacific coast in 1803–1806. (2) What is the origin of the expression

"to pan out"? (3) Why do the heavier rains on the northern Pacific coast come in winter? (4) Mention several of the advantages and disadvantages of having no rain for several months at a time, as in southern California. (5) Make a collection of minerals for the school. (6) Hydraulic mining has been largely prohibited in many parts of the West. Why? (7) Should the ditch that is to irrigate a certain field skirt its upper or lower edge? Why? (8) Which is the more easily irrigated, nearly level land, or land that is rough and hilly? Why? (9) Is southern California so liable to cold snaps as Florida Why (10) Make a list of articles made of wool. (11) Why have Arizona and New Mexico not become states? (12) Find out about the wild animals in Yellowstone National Park. (13) Write a story describing a visit to southern California. (14) Make a drawing of the Western States.

GENERAL REVIEW QUESTIONS FOR THE UNITED STATES

(1) Name the principal crops of the United States, and tell in which section each is raised. (Consult the figures, 237 to 259.) (2) Do the same for mineral products. (3) For other raw products. (4) For manufactured articles. (5) Name the five largest cities in their order. For what is each important (6) State some ways in which the rainfall influences the occupations of the people. (7) The temperature. (8) State clearly the influence of the sinking of the coast. (9) Of the glacial period. (10) Of the coal period. (11) Of the absence of forests on the prairies. (12) Of the rich mineral deposits in the West. (13) In what ways have the Great Lakes been of value? (14) Name some of the cities that have been benefited by them. (15) In what ways have the Mississippi River and its two largest tributaries been of value? (16) State the natural advantages that have aided the growth of Boston, New York, Buffalo, Philadelphia, Baltimore, New Orleans, Detroit, Chicago, St. Louis, and San Francisco. (17) Can you name some other cities that have also been influenced by their surroundings? (18) Which is the largest state? (Appendix.) The second in size? The smallest? The next to the smallest? (19) Which state has the largest population? (Appendix.) The second largest? The smallest? Next to the smallest? (20) Draw a map showing the states on the Atlantic coast. Also make a map of those along the Pacific coast; along the Great Lakes; the Mississippi River; the Ohio; the Missouri. (21) What states border Mexico? Canada?

For REFERENCES, see *Teacher's Book*.

FIG. 175.

MAP QUESTIONS. — (1) Find Alaska on Figure 44. What waters surround it? What country bounds it on the east? (2) Locate Sitka, Circle City, Nome City, and Dawson City. (3) Trace the course of the Yukon. (4) Find the Aleutian Islands. What sea north of them? (5) Find the Pribilof Islands. (6) From Figure 8 tell about the relief of Alaska. (7) Locate Mt. St. Elias, Mt. McKinley.

FIG. 176.

Mt. St. Elias, Alaska, 18,100 feet high, and for a long time supposed to be the highest peak on the continent.

FIG. 177.

Snow-covered Alaskan mountains with a valley glacier descending into the sea.

FIG. 178.

Front of the Muir Glacier where it ends in the waters of Muir Inlet.

X. TERRITORIES AND DEPENDENCIES OF THE UNITED STATES

At the close of the Revolutionary War the United States consisted of thirteen small colonies along the Atlantic coast from Maine to Georgia. The United States claimed the land far into the wilderness, even to the distant Mississippi. Beyond this was French and Spanish territory, while the whole Mississippi Valley was occupied by Indians. By purchase and by war we have acquired all the land between the Atlantic and the Pacific which has been described in the previous pages; but our control does not end with the boundaries of the United States proper. In 1867 we acquired Alaska, and in 1898 we came into possession of a number of islands, some of them on the other side of the globe. Since these lands form a part of the territory controlled by our government, a study of them properly comes at this point.

Alaska

Climate and Physiography. — For a long time Alaska, which is more than twice as large as Texas, belonged to Russia. That nation sold the territory to us for $7,200,000; but at the time many people considered it very unwise to pay so large a sum for so distant and desolate a land. However, it has already proved of great value, and has paid for itself many times over.

Since the Arctic Circle extends across the northern part of Alaska, it will be seen that the climate must be very uninviting. The winters are long and cold, and the summers short and cool. A strip of coast land extends southward from the main peninsula of Alaska, and to this the prevailing westerly winds bring an abundance of rain and snow. Since these winds come from the ocean they also render the summer climate much less cool than in the northern

part of the territory. In this portion is situated SITKA, the capital, where the governor of the territory lives.

A large part of Alaska is mountainous, for the mountains of the United States and western Canada extend northward into this territory. Among these mountains are the loftiest peaks of the continent, the highest yet discovered being Mt. McKinley, which is 20,464 feet high. Owing to the latitude, most of the mountains are snow-covered throughout the year (Fig. 176), and among them are innumerable glaciers, many of which reach down to the sea (Fig. 177).

FIG. 179.

A whale ashore, and a whaling steamer lying off in deep water.

One of the largest glaciers now on the continent, known as the *Muir Glacier* (Fig. 178), is located in Alaska not far north of Sitka. It is so wonderful and beautiful that many tourists visit it every year. The long peninsula and the chain of Aleutian Islands which form the southern boundary of Bering Sea are really a growing mountain chain 1600 miles in length. All together there are 57 volcanoes in this chain, and it was here, in 1795, that a new volcano suddenly broke forth, building a lofty cone where previously ships were able to sail.

Fishing. — Among the resources of Alaska, as in the case of other far northern lands, those of the sea are especially important (p. 21). In the shallow waters near the coast both cod and halibut

abound, while immense numbers of salmon run up the rivers every summer, as they do in northern United States and Canada (pp. 173 and 199). The fishing industry is only partly developed, chiefly because of the great distance from a profitable market; but the waters of the Alaskan coast form an important fishing reserve for the future.

Whaling. — Every year steamers, specially built for the purpose, venture through Bering Strait into the Arctic Ocean in search of the whale. It is a hazardous occupation, and but few ships are now engaged in it. They are obliged to push their way into the *floe* ice (Fig. 316), in which they are in danger of being imprisoned and held firmly through the winter.

A whale (Fig. 179), which is sometimes over a hundred feet long, is really a land animal which has taken up life in the sea, as seals and walruses have. Therefore, unlike the true fishes, which secure air from the water by means of gills, the whale must now and then rise to the surface for air. It is when rising to breath, or "blow," that the huge creatures are harpooned.

One species of whale living in the Arctic supplies not only fat, or *blubber*, for oil, but also *whale bone*, a very elastic material which grows in the whale's mouth. Rushing through the sea with its mouth open, the whale strains the water through the fringes of the whale bone, and thus secures the thousands of tiny animals upon which it feeds. This bone is of use for various purposes, as, for instance, in women's dresses.

Fig. 180.
Fur seals among the rocks near the coast of one of the Pribilof Islands.

Sealing. — In the Arctic are found many different kinds of seal. One of these, the *fur seal*, which lives in Bering Sea, is of great value because of its soft fur, which is much used for winter cloaks. During the greater part of the year the fur seals swim in the sea in search of food; but in the spring, during

the breeding season, they resort to the Pribilof Islands. The United States government prohibits all persons from killing them except one

Fig. 181.

Driving off a bunch of fur seal for slaughter.

company, which pays a special tax for the privilege of securing a certain number each year. At the proper season the men select a number of males, — for a law forbids the taking of the females, — and drive them off for slaughter, much as sheep would be driven (Fig. 181).

Mining. — While there is some opportunity for farming in southern Alaska, and the great tracts of forest land may be the seat of an important lumbering industry in the future, at present the most noted industry of Alaska is gold mining. There are extensive deposits of gold, copper, coal, and other minerals; but they are so difficult to reach that there has been little development of any of these except the first. A short distance north of Sitka, at Juneau, there are some very paying gold mines; and elsewhere in the territory gold mining is also carried on.

Fig. 182.

Miners with their loads of supplies, at Chilcoot Pass, on the way to the Klondike.

Recently, Alaska and the neighboring Klondike region, just across the line in Canada, have attracted attention because of the discovery of rich deposits of gold-bearing gravels, somewhat like those found in California in 1848. Although a bleak, desolate region, far in the interior and difficult of access, men have rushed there, as years ago they hurried to California. Some have gone overland across the mountain passes (Figs. 182 and 183); others have travelled an easier route by water, taking a steamer to the mouth of the Yukon River, one of the longest rivers on the continent. There they transferred to river boats; but since the Yukon is frozen over during most of the year, this journey can be made only in summer.

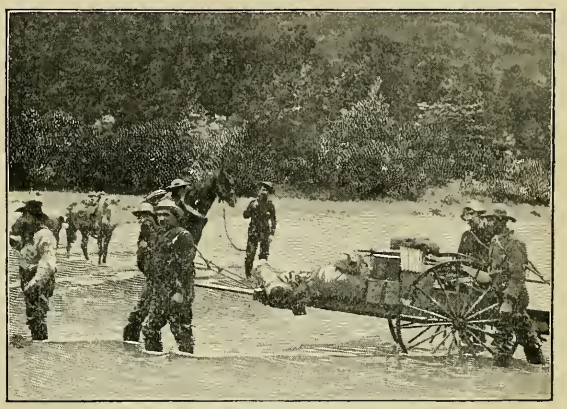


FIG. 183.

Miners fording the icy waters of an Alaskan river, on the way to the Klondike. Two of them are harnessed in a wagon containing their supplies.

In the scramble for gold many persons have endured terrible hardships. Most have returned with little of the precious metal, but some have brought back fortunes. Good-sized towns have grown up as a result of the inrush of people, the largest being DAWSON CITY, Canada, and CIRCLE CITY in Alaska, just south of the Arctic Circle. Another city that grew in a single season is NOME CITY.

CUBA AND PORTO RICO

While the United States has within recent years secured possession of bleak northern lands, it has still more recently come into control of some warm tropical islands. As a result of the war of 1898, Porto Rico was ceded to the United States, and Cuba was given its independence under the general guidance of the United States.

Physiography and Climate. — Among the West Indies (p. 219) the largest island is Cuba, which is nearly as large as Pennsylvania, although much longer and narrower. The next in size is Haiti, and of the others the only two of much importance are Jamaica and Porto Rico, the latter being three-fourths the size of Connecticut. Cuba, Haiti, and Porto Rico form a portion of a single mountain chain, highest in Haiti, though reaching an elevation of 8600 feet in Cuba.

While there are tree-covered mountain ranges in each of the islands, a large portion of Cuba and Porto Rico has been cleared and cultivated. This is especially true of Porto Rico, which is really an island of farms. Crops grow luxuriantly, partly because of the excellent soil, formed by the decay of the rocks, and partly because of the favorable climate.

The islands are entirely within the tropical zone, so that their temperature throughout the year is high ; and on the lowlands neither snow nor frost are known. They receive an abundance of rain, especially upon the northeastern or *windward* slopes, where the damp air of the winds which blow from the northeast first reaches the land. The summer is the rainiest season, for then these winds blow with greater strength and steadiness.

Forests and Minerals. — When first settled, the West Indies were covered by a dense tropical forest. Much of this has been cleared away for purposes of farming; but some of the woods still remain, especially among the higher mountains. In Cuba, for instance, there is still much valuable timber, such as mahogany, ebony, and fustic, which produces a valuable yellow dye.

Besides these raw products of the soil, there is considerable mineral wealth in Cuba. Copper is found there, and also iron, the latter having been mined for a long time in the neighborhood of SANTIAGO.

Agriculture. — However, it is agriculture that forms the chief industry of the Cubans and Porto Ricans. As in all the West Indies, the principal crop is sugar-cane (Fig. 231), which grows well in the rich soil and the warm, rainy climate. Although much sugar is raised, the industry has not proved very profitable because of the primitive methods employed and the absence of a good market. Now

FIG. 184.

MAP QUESTIONS. — (1) Find these islands on Figure 44. (2) Which is the largest island? (3) Name three others in order of their size. (4) What island lies south of Cuba? What is its capital? (5) What group of islands lies north of Cuba? To what nation do these islands belong? (6) What other nations own islands in the West Indies? (7) On the map, Figure 44, find the Bermuda Islands. (8) What waters bathe the shores of the West Indies? (9) Find Havana, Santiago de Cuba, Matanzas, Ponce, and San Juan.

that the United States has come into closer relation with these islands great improvement should take place.

Sugar production is carried on in Cuba much as it is in Louisiana (p. 102). After the cane is cut, the sap is extracted and reduced to brown sugar in sugar houses, and then sent away to be manufactured into white sugar. Two of the products of the sugar plantations are molasses, and rum, which is made of molasses.

FIG. 187.
A Cuban ox team.

A second important crop is tobacco, for which Cuba is especially noted. There is one district, on the western end of the island, where the rich, limey soil and the climate are peculiarly suited to the growth of the best quality of tobacco. At HAVANA and other places it is manufactured into cigars, which bring high prices — the Havana cigar being considered the best that is made. What has been said about Key West in Florida?

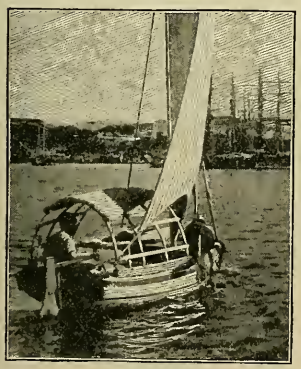


FIG. 188.
A Cuban boat.

Upon the hillslopes much coffee is produced, and some tea and cocoa. The coffee plant not only requires a good soil, but must be grown in the shade of trees. Spices, including nutmeg, cinnamon, and ginger, are products of the West Indies, also pepper, cardamom, vanilla, and pimento or allspice. Such fruits as bananas, oranges, limes, pineapples, and cocoanuts are also produced; but, because of the poor market, in small quantities. In the future much more attention will doubtless be paid to fruit raising. Indeed, both Cuba and Porto Rico will probably

now become not only winter gardens, supplying fruit and vegetables to the United States, but also important winter resorts.

The United States has been able to raise almost all products of the soil that we have required, with the exception of the tropical and semi-tropical crops, such as tea, rice, coffee, sugar, spices, and tropical fruits; and our newly acquired islands are capable of supplying even these.

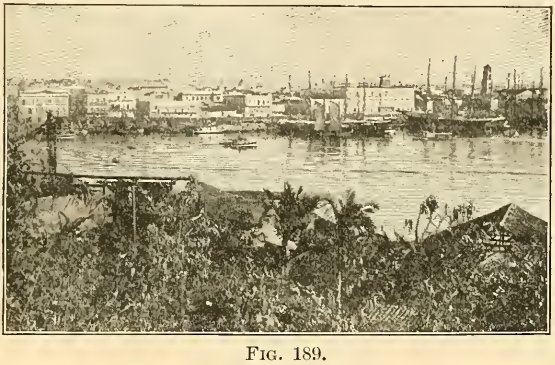


Fig. 189.
The harbor of Havana.

The Inhabitants. — Portions of Cuba and Porto Rico are densely populated, although in Cuba's war with Spain thousands upon thousands of the inhabitants were killed in battle or starved to death. Property has been destroyed, and the island devastated to such an extent that it will be many years before a full tide of prosperity returns.

Many of the natives are of mixed blood. The aborigines did not prove good slaves to their Spanish conquerors, and negro slaves were brought from Africa. Therefore, while pure-blooded Spaniards are numerous, many of the inhabitants of Cuba and Porto Rico are negroes, either full blooded or half-breeds. The Spanish have kept these natives very poor and densely ignorant; but they are capable of advancement under proper guidance, and this, it is hoped, they will receive from the United States.

Cities. — Owing largely to an entire lack of coal and to the policy of the Spaniards, there has been very little manufacturing; but nevertheless there are several important cities, principally along the coast, at points where there are remarkably fine harbors. The largest of these is Havana in Cuba, a city of 235,000 inhabitants, and for a long time the centre of the Spanish dominion in America. Another large city in Cuba is Santiago de Cuba, where the Span-

ish ships were sunk in 1898 (see map, Fig. 184). A third important city, with an excellent harbor, is MATANZAS.

Railway lines connect some of these cities and also reach out into the agricultural districts, thus serving to bring the crops to these ports for shipment. However, many of the towns are not connected by rail; and since there are few good wagon roads, they have almost no communication with the outside world, excepting by boat.

FIG. 190.
A street in San Juan, Porto Rico.

The conditions in Porto Rico are nearly the same as in Cuba, though it is less wooded than Cuba and more completely cultivated. Along the lower sections, near the coast, sugar and tobacco are raised; the low mountains produce excellent coffee, one of the most important products of the island; and the slopes between these two sections are largely occupied by herds of cattle. As in Cuba, there are a number of coastal cities, the largest being PONCE and SAN JUAN (Fig. 190), the capital.

THE HAWAIIAN ISLANDS (Fig. 194)

The Volcanoes. — Far out in the mid-Pacific, not quite a third of the distance from the Pacific coast to the Philippine Islands, is a mountain chain fifteen hundred miles long, most of which lies beneath the ocean. From this long, submarine ridge there rise several volcanic peaks, forming a chain of islands, known as the Sandwich or Hawaiian Islands. The largest is Hawaii, which is nearly as large as Connecticut.

Each of the islands is composed chiefly of lava which has been erupted from within the earth. Two of the large Hawaiian volca-

noes are still active, the largest, Mauna Loa, extending nearly fourteen thousand feet above the sea. From the coast the sea bottom

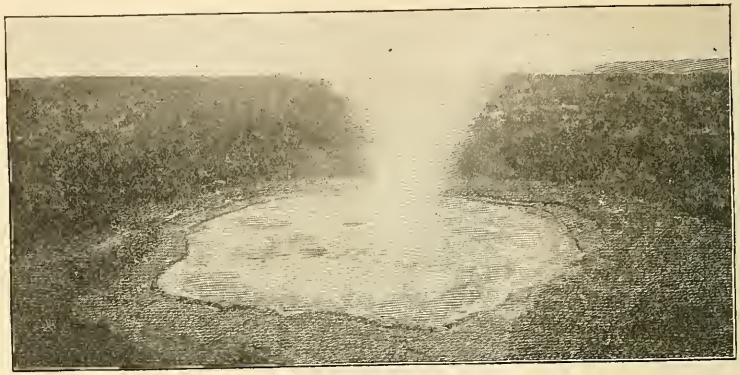


FIG. 191.
Lake of liquid lava in one of the craters of the Hawaiian volcanoes.

descends so rapidly that, within a few miles of the shore, a depth of eighteen thousand feet is found. Therefore, if the water should be removed, a mountain peak would be revealed rising nearly thirty-two thousand feet above its base — a loftier mountain than any known on the land.

Climate. — The latitude of the Hawaiian Islands (Fig. 585) is about the same as that of Cuba and Porto Rico. Being in the midst of the broad Pacific, and therefore surrounded by warm ocean water, the climate near sea level is warm and wonderfully equable. From day to night, and even from summer to winter, the thermometer varies only a few degrees. As in the West Indies, the northeast winds blow steadily and bring an abundance of rain to the windward northeastern slopes. The opposite or *leeward* slopes are very much drier, and in places even arid.

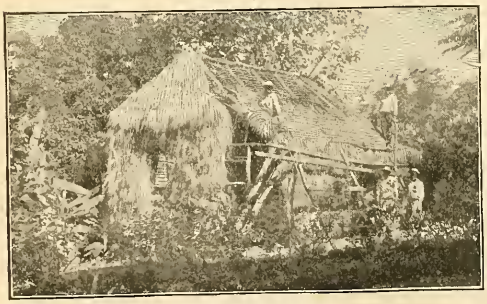


FIG. 192.
Building a grass hut in the Hawaiian Islands.

Industries. — The Hawaiian Islanders are an intelligent race, resembling the natives of other Pacific islands. Since white men brought in new methods of agriculture, the larger islands have become fairly productive, the principal crop being sugar. Coffee, tropical fruits, and rice (Fig. 193) are other products, the last being cultivated by the Chinese, who make up a large part of the foreign population. There are also many Japanese, Portuguese, and Americans. The chief market has been the United States, especially San Francisco. In fact, these islands formed one of the principal sources of food supply for the early Californian miners.

FIG. 193.
Planting rice in the Hawaiian Islands.

The white men's interests in the Hawaiian Islands led to a revolution some years ago, by which these men took control of affairs from the native queen, set up an independent government, and offered themselves to the United States as a territory. After some delay this offer was accepted.

While some of the inhabitants are engaged in agriculture, large numbers are gathered in small villages along the seacoast. There are only two cities, HONOLULU on the island of Oahu, and HILO, on Hawaii.

The Hawaiian Islands as a Coaling Station. — During the war with Spain the Hawaiian Islands were of importance to the United States as a coaling station for ships bound to the Philippine Islands. The distance from San Francisco to the Philippines is somewhat more than seven thousand miles. If we wish to send a warship there from the Pacific coast, it is quite necessary that it should find a place on the way at which it could obtain coal. Such a ship might carry perhaps eight hundred tons of coal; but as it may burn from sixty to seventy tons a day, this would last less than two weeks, while the journey across would require more than three weeks. Therefore the government needs a place where it can store large quantities of coal, perhaps as much as from ten to twenty-

five thousand tons, to be used in case of need. All large naval powers need coaling stations in various parts of the ocean. Great Britain, the greatest power upon the sea, has them scattered all over the world.

Guam and Samoa

For a number of years the United States, Germany, and England had control over the Samoan Islands (Fig. 194); but this arrangement did not prove satisfactory, and now Tutuila, one of the islands, is owned by the United States. This tiny island is of little value to us excepting for the coaling station at the harbor of Pago Pago (Fig. 194). The natives are of the same race as those of the other islands of the open Pacific. They are splendidly developed physically, and manage a boat and swim so well that they are almost as much at home in the water as on land. The principal products are cocoanuts and cotton, and the chief city is Apia, on Upolu, which belongs to Germany.

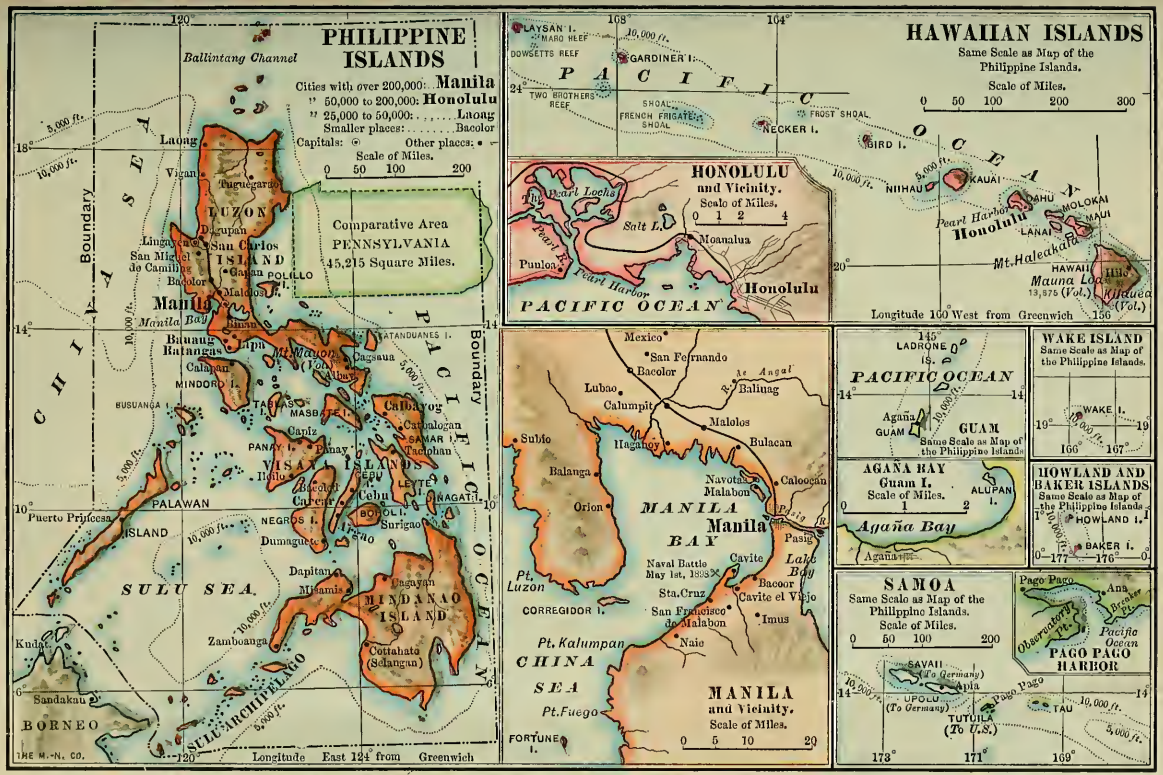
In consequence of the war with Spain, we obtained the island of *Guam* (Figs. 194 and 585), one of the Ladrones or Robbers' Islands, some distance east of the Philippines. These islands, the loftiest peaks of a submarine mountain chain, were first seen by Magellan, who was later killed by the natives of the Philippines. Guam, the largest of the Ladrones, reaches an elevation of from fifteen to eighteen hundred feet above the sea; but it is so small, and so far away, that it also is of little service to us except as a coaling station for vessels.

The Philippine Islands

PURCHASED FROM SPAIN IN 1898 FOR $20,000,000

Physiography. — This group of islands, or *archipelago*, consists of several thousand separate islands, many of which are very small. The largest, Luzon, is about the size of Kentucky, and the second, Mindanao, is almost as large. Like the West Indies and the Hawaiian Islands, the Philippines are portions of mountain chains in the sea. They form part of a still greater chain, reaching northward to the Japanese Islands and beyond.

Throughout the archipelago earthquakes are common and sometimes very destructive to property and to life; for instance, the earthquake of 1863 destroyed a large part of Manila. The earth is in an almost constant state of tremor, though most of the shocks are so slight that they are detected only by the aid of delicate instruments. In addition to earth-



UNITED STATES' DEPENDENCIES IN THE PACIFIC.

FIG. 194.

MAP QUESTIONS. — *Hawaiian Islands.* — (1) Name the two largest islands. In what latitude do they lie? (Fig. 585.) (2) On what island is Honolulu? Hilo? (3) How deep is the ocean near these islands?

Guam and Samoa. — (4) In what latitude is each? (5) What harbor on the island of Tutuila? (6) How deep is the ocean near these islands? (7) Find each on Figure 585.

Philippine Islands. — (8) Where are these located? (Fig. 585.) (9) Name the two largest islands. (10) What should you expect the climate to be? (11) Find Manila. On which island is it situated?

quakes, there have at times been destructive volcanic eruptions. Some of the volcanic cones of the Philippines reach to a height of 8000 to 10,000 feet.

While parts of the islands are mountainous and still covered by forests, there are many valleys that have been cleared for farming. In these the soil is usually deep and fertile, being formed by the decay of lavas, limestones, and other rocks rich in plant food.

Since none of the islands are very large, there can of course be no great rivers; but many of them are so deep near their mouths that small steamboats are able to navigate the lower portions of all of the larger streams. Near the volcanoes there are lakes formed by the lava damming up the streams.

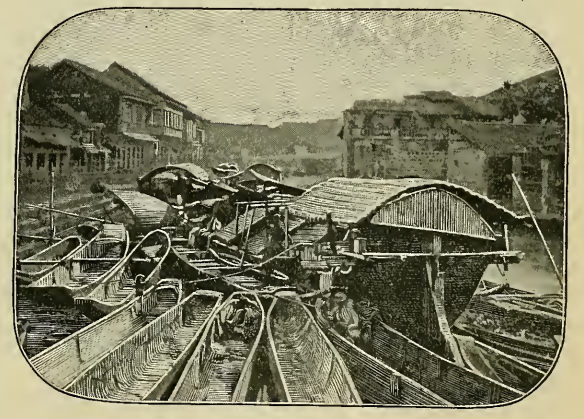


FIG. 197.
Philippine boats, really logs with the centre dug out.

Climate. — Besides earthquakes and volcanoes, the Philippines are visited by terrific tropical storms or hurricanes which are called *typhoons*. Commencing in the heated belt near the equator, they develop intense energy, and move slowly off into the temperate latitudes. They are accompanied by a terrific downpour of rain and by winds so violent that houses are torn to pieces, and trees dragged out by their roots. During these storms much property is destroyed, and many lives are often lost.

As in the West Indies, the climate of the Philippines is that of the tropics — always warm, and sometimes very hot, especially at a distance from the sea. They have a heavy rainfall, the year being divided into the dry and rainy seasons. The former comes during the winter months, the latter in the summer. The dry period lasts while the winds blow from the northeast, and then the fields often become parched and cracked, and the roads very dusty. In the summer, however, the winds change to the southeast, and as they

blow from the warm, humid equatorial belt, they deluge the islands with rain to such an extent that much of the country becomes a swamp, and travel is almost impossible. The showers are local; and while a heavy downpour occurs in one place, a short distance away on the leeward slopes, there may be no rain.

The natives have domesticated a native wild animal, the water buffalo (Figs. 196 and 198), which is so accustomed to the mud that it can be driven about during the wet season. This draft animal is of great use, especially in the rice fields, which are kept wet during the growing season. The buffalo prefers wet walking to dry, and, in fact, must have a daily plunge in the mud and water.

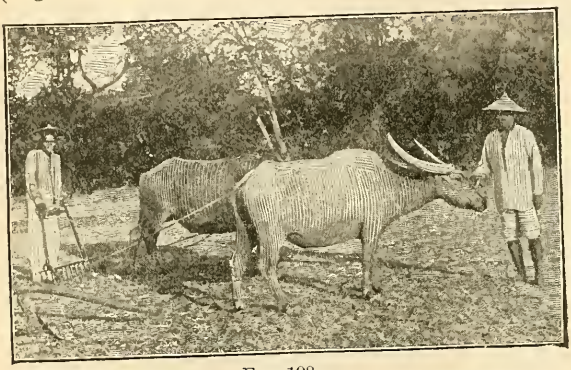


Fig. 198.
Philippine natives and the domesticated buffalo.

Because of this damp climate, the Philippine houses are so built that the lower story is used for storage, as a cellar is in our country. This raises the inhabited part of the house above the damp ground (Fig. 195).

Resources and Industries. — Owing to the tropical warmth and dampness and to the excellent soil, the uncultivated parts of the islands are covered with a dense tropical forest, containing many valuable woods. As in other tropical forests, there are immense numbers of animals, especially insects, serpents, and beautiful birds. Among the serpents are the huge python and the deadly cobra di capello. There are also deer, apes, wild hogs, wild buffalo, huge bats, and man-eating crocodiles.

The inhabitants of the Philippines number from eight to ten millions, about one-half of whom are civilized; but there are still many savages on some of the islands, especially in the dense forests. Two very different races occupy the islands, — the aborigines and the *Malays*. The former, a race of small, dark-skinned savages, are

called *Negritos*, a Spanish word meaning little negroes. They have been gradually forced to retreat to the forests by the more powerful and intelligent Malays. Besides the Negritos, the various tribes of Malays, and the half-breeds, many Chinese traders and Spaniards live on the islands.

Under the influence of the Spaniards, the more civilized tribes, whom Magellan found in a savage state, have cleared the land and have reached a fairly high grade of civilization. Their wants are few, and very little work suffices to keep them supplied with what they need. Cocoanuts and

FIG. 199.
Philippine boys making cigars.

bananas are easily obtained, and rice, yams, and other plant foods may be raised with very little effort. There is, therefore, no special reason for working hard; and, in fact, in that climate hard work is almost impossible.

The riches of the forest are scarcely utilized at all. Among the valuable woods are ebony, the rubber tree from which gutta percha is obtained, and a palm from the sap of which alcohol may be made. Cinnamon, cloves, and pepper also grow there.

The mineral resources appear to be extensive, although almost entirely undeveloped, since the Spaniards never encouraged mining there. Gold is known to exist in Luzon, and silver, coal, petroleum, marble, and sulphur also occur.

Aside from plant products consumed at home, some cocoa, coffee, sugar (Fig. 196), and tobacco are raised for export, the latter being manufactured into cigars at MANILA (Fig. 199). This is almost the sole manufacturing of importance, and the inhabitants depend upon

Europe and America for all but the very simplest materials, which they themselves produce.

Hemp is the best-known export of these islands, which supply the world with the fibre used in making the better grades of Manila rope. Hemp is made from the fibre of a wild plantain, which so closely resembles the banana that an inexperienced person cannot easily tell the two apart. In order to obtain the fibre, the plant is cut and allowed to wilt for a short time, then drawn between a block of wood and a knife, in order to scrape the pulp away. The fibre is spread for several hours in the sun to dry, and then pressed into bales for shipping. Since the work is crudely done by natives, without the aid of machinery, about 40 per cent of the fibre is wasted.

The castor bean grows wild on many of the islands, and its oil is extracted for many local purposes. Cocoanut palms also flourish, and great rafts of cocoanuts are shipped down the rivers to the sea. From this nut an oil is made that is used in lamps and sometimes in the manufacture of a substitute for lard. Much of the dried meat of the nut, called *copra*, is shipped to Europe to be used in soap making.

Fig. 200.

A Philippine lumber yard, where bamboo is the lumber. Compare this with Figures 54 and 155.

One of the most remarkable plants of the island is the rattan, which is put by the natives to a thousand uses, such as making ropes, houses, canoes, frames, carts, beds, and chairs. Many of the natives make a living by splitting and marketing the cane. The bamboo is also of great value, being considered indispensable by the natives (Fig. 200). This plant grows from one inch to eighteen inches in diameter, and from five to seventy feet in height. It is used in making the frames, sides, and even the roofs of houses, and also rafts, boats, agricultural implements, bows, bowstrings, arrows, spoons, forks, and many other articles.

Under the Spanish rule the people of the Philippines were greatly oppressed, and the industries only partly developed. Large

portions of the islands were left in a wild state; and even in the best-settled regions little attempt was made to develop the resources. The islands are able to produce not only quantities of sugar, rice, tobacco, coffee, and cocoa, but also much more hemp than at present. What has been said about the valuable forest and mineral products?

There is a promising future in the proper development of all the resources of these islands, and the civilized natives are able to help in the work. Many of them are educated and cultivated, living in excellent homes and surrounded by luxuries. In religion, most of the inhabitants belong to the Roman Catholic faith, which was early introduced by the Spaniards. However, the natives of the Sulu Islands, called *Moros*, are Mohammedans. These Moros are ruled by a Sultan under the general guidance of the United States.

Cities. — In the Philippine group there are many cities having a population of more than ten thousand, and a number have as many inhabitants as Gloucester, Massachusetts, Jacksonville, Florida, or Butte, Montana. However, there is at present only one city of great importance in the archipelago, namely, MANILA, on the island of Luzon, a city nearly as large as St. Paul. It is situated upon an excellent harbor, and was for a long time the centre of the Spanish government in the Philippines.

REVIEW QUESTIONS AND SUGGESTIONS

Alaska: QUESTIONS. — (1) From whom was Alaska obtained? How? (2) Describe the climate. (3) Name and locate the capital. (4) What are the surface features? (5) Locate the Muir Glacier. (6) Tell about the volcanoes. (7) What kinds of fish are found? (8) Describe whaling. What valuable products are obtained? (9) Tell about the seals: — where found; habits; efforts to protect them; method of killing; their value. (10) Describe mining in Alaska: — minerals found; location of the gold mines; cities that have grown up; the rush of gold seekers; the change that they have brought about.

SUGGESTIONS. — (11) Collect some whalebone. (12) Collect pictures of Alaska. (13) Find out what people thought when the purchase of Alaska was being considered. (14) Try to find some one who has been in Alaska, and have him tell you about the country. (15) How does the area of Alaska compare with that of the United States proper? With your own state? (See Appendix.) (16) Measure the length of the Yukon, and compare it with the Mackenzie and the Mississippi. (17) Draw an outline map of Alaska.

Cuba and Porto Rico: QUESTIONS. — (18) Name the principal islands of the West Indies. (19) Tell about their relief; their climate. (20) What is the reason

for the heavy rains of summer? (21) What about the forests and their peculiar products? the minerals? (22) Name the principal farm products, and tell about each. (23) Tell about the inhabitants. (24) Why so little manufacturing? (25) Name and locate the chief cities in Cuba and Porto Rico.

Suggestions. — (26) Estimate the length and the average breadth of Cuba. (27) How do its two leading cities compare in size with the two largest in Pennsylvania? (Appendix.) (28) What products of Cuba and Porto Rico are also raised in the United States? Where? (29) State some advantage that Cuba enjoys over Louisiana in the production of sugar. (30) In what respects are the inhabitants similar to those of Mexico? (31) How is our control of these islands liable to prove of benefit to us? To the islands themselves? (32) Make a sketch map of Cuba and Porto Rico.

The Hawaiian Islands: Questions. — (33) Where are the islands? (34) How have they been formed? (35) Tell about the volcanoes. (36) About the climate. (37) Name the leading products. (38) The principal cities. (39) How did the islands come into our possession? (40) Of what use are they to us?

Suggestions. — (41) Why should you expect much the same products in the Hawaiian Islands as in Cuba? (42) Why is not the summer very hot in this tropical region? (43) What city on the eastern coast should be associated with San Francisco as important for refining sugar? (44) Explain the presence of many Chinese and Japanese in these islands.

The Philippine Islands: Questions. — (45) Name the two largest islands. (46) How have the islands been formed? (47) Tell about the earthquakes. The soil. The rivers. (48) About the typhoons, and the dry and rainy seasons. (49) What about Philippine houses? Draft animals? (50) Tell about the forests and wild animals. (51) About the native inhabitants. (52) About the farm products. (53) About the manufacturing. (54) What are the future prospects of the islands? (55) Locate the principal city.

Suggestions. — (56) Compare the latitude of the islands with that of the West Indies and of the Hawaiian Islands. (57) In what other places thus far studied have volcanoes abounded? (58) Collect pictures of scenes in the Philippines. (59) Obtain a piece of Manila hemp rope for the school collection; also a piece of bamboo and of rattan. (60) Tell about Dewey's capture of Manila. (61) Make a sketch map of the islands.

General Questions. — (62) Name the dependencies of the United States. (63) Walk toward each. (64) Name the principal products of each. (65) In what zones do they lie? (66) How did we obtain each?

For References, see *Teacher's Book*.

FIG. 201.

Newfoundland sealers killing seals on the floe ice off the coast of Labrador.

FIG. 202.

A Greenland Eskimo kayak.

FIG. 203.

A group of Esk..o children in Greenland.

Fig. 204.

Map Questions.— (1) Trace the boundary line between United States and Canada. Which part of it is natural boundary? (2) Which states border on Canada? (3) Why are there so many lakes in the Dominion? (4) Name the seven largest (including the Great Lakes). (5) Name the five largest rivers; tell in which direction each flows and where it

mpties. (6) Where are the large cities? (7) What are the names of the largest? (8) Can ou see any reasons for their location? (9) Trace the Arctic Circle across Canada. (10) Com- are the latitude of Labrador with that of England (Fig. 585). (11) Draw an outline map f Canada, inserting the important rivers, lakes, and cities.

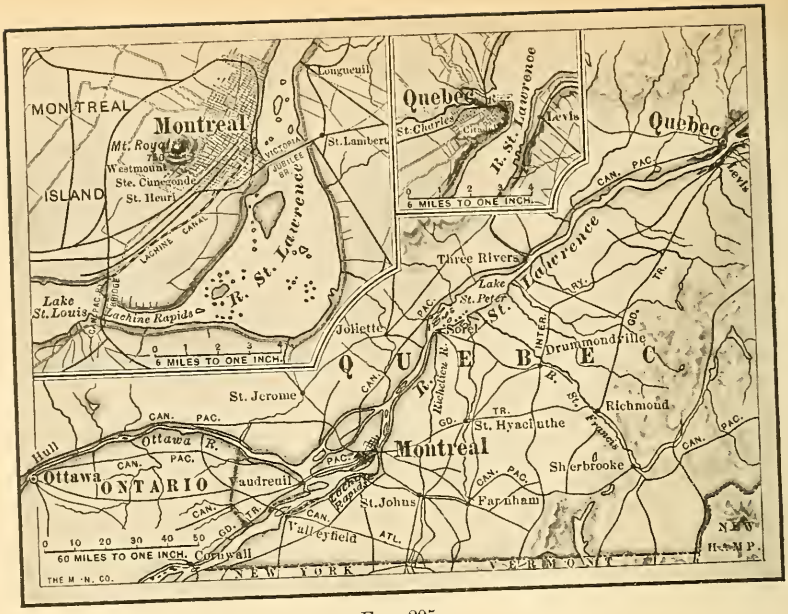


FIG. 205.

Map showing the location of Montreal and Quebec.

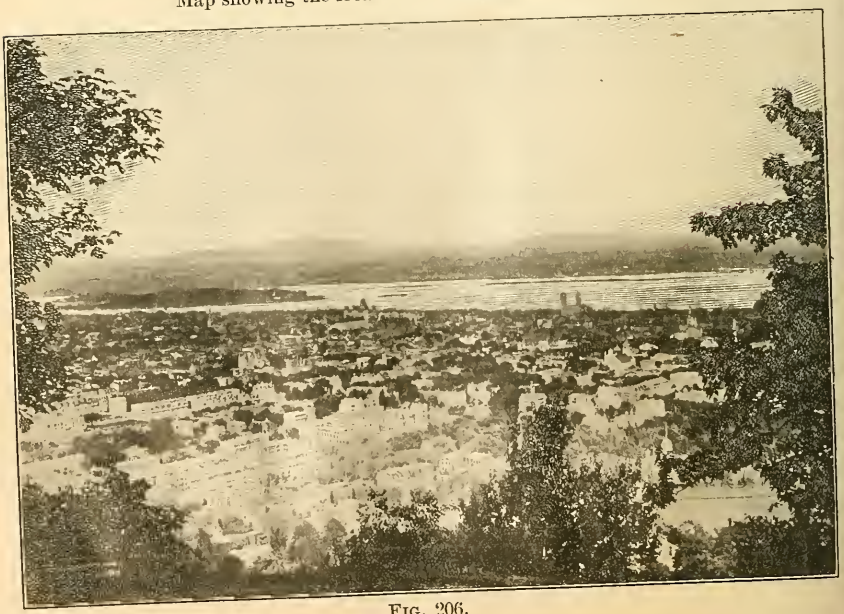


FIG. 206.

A view of Montreal from the mountain back of the city—the St. Lawrence in the distance.

XI. COUNTRIES NORTH OF THE UNITED STATES

Canada and Newfoundland

As we have learned, the northwestern extremity of North America is in possession of the United States; but almost all of the remaining land north of our country belongs to Canada.

History. — While the British were founding the thirteen colonies, the French occupied the coast of eastern Canada and made settlements along the St. Lawrence valley, as at Quebec and Montreal. Even now four out of every five persons in the Province of Quebec speak French as their mother-tongue. The French and English were often at war; but finally England, aided by her colonies, acquired control of all the French possessions north of the United States, except the small islands of *Miquelon* and *St. Pierre*, which are still retained by the French as fishing stations.

After the Revolutionary War, Canada still remained in the possession of Great Britain. There were at first several colonies, or *provinces*, with separate governments, though all were under the control of Great Britain; but in 1867 a union was formed called the Dominion of Canada. Each of the seven provinces — Nova Scotia, Prince Edward Island, New Brunswick, Quebec, Ontario, Manitoba, and British Columbia — now has a government of its own, as our states have; but by their union they also have a central government with the capital at Ottawa, which corresponds to our capital at Washington.

Besides these provinces, there are four organized territories: Assiniboia, Saskatchewan, Alberta, and Athabasca; and also a number of unorganized territories, or territories without a regularly organized government. Most of the latter are practically a wilderness and of little importance at present. Their names will be found on the map (Fig. 204).

Newfoundland has refused to join this federation, so that, while still a province of Great Britain, it has no connection with Canada. Under the government of Newfoundland is included, not only the island, but also the east coast of Labrador.

Fig. 207.

A view among the mountains of British Columbia, through which the Canadian Pacific passes.

As in the case of the United States, the early settlements in Canada were made in the east, though westward migration has now opened up not merely the interior, but even the mountainous western part. At present, the population is over five million, more than one-fourth of whom are French.

Physiography and Climate. — The climate of southern Canada is similar to that of northern United States, though of course slightly cooler. Its physiography is nearly the same also; and since the glacier, which spread over northeastern United States, had its origin in Canada, the effects are found there, as here. Lakes, falls, and rapids abound, and the soil is made of glacial drift.

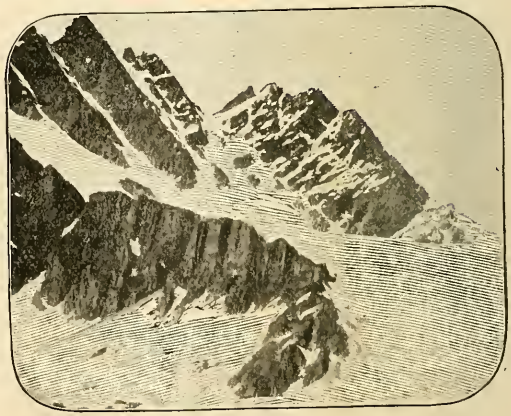


Fig. 208.

One of the snow-capped mountain peaks of British Columbia.

The surface of eastern Canada is much like the surface of New England; and, as in New England, there is much beautiful scenery. That section of Canada which lies north of Ohio and New York is more level, like those states, and it

is the most important farming region in the Dominion. Farther west, north of Dakota and Montana, are broad plains (Fig. 213), arid in the western part, and increasing in elevation to the very base of the Rocky Mountains. After crossing these plains, the Canadian Pacific Railway, which extends from the Atlantic to the Pacific coast, follows the valleys among the mountains, and climbs to the passes amidst canyons, glaciers, and snow-capped peaks (Figs. 207 and 208). Name the mountains (Fig. 204). The scenery of this region is wonderfully grand and picturesque, and the railway passes through the midst of it. A portion of this wonderland has been set aside as a national park by the Canadian government.

The headwaters of the Yukon River, mentioned under Alaska (p. 181), are in Canada; and farther east than this is the Mackenzie River, one of the largest on the continent. It is 2000 miles long. What three large lakes drain into the Mackenzie? Why is that river of little use for navigation? What other large Canadian rivers drain into northern waters? How would they be more useful if they drained southward, as the Mississippi does?

Canada shares with the United States the privileges of navigation on all the Great Lakes, with one exception. Which is it? In addition to these great waterways, the lower St. Lawrence is entirely in Canada; but on account of the severe winters this is not so great an advantage as might at first appear. Why?

There are numerous rapids in the St. Lawrence, over which vessels cannot pass; but large ship canals have been built around these. Now, therefore, all but the large ocean steamers are able to go from the open ocean to the western part of Lake Superior, a distance of twenty-four hundred miles. In this respect the Canadian route has a great advantage over the Erie Canal route upon which only small canal boats can go. However, there is a movement on foot to deepen the Erie Canal so that lake vessels can pass through it also.

Although southern Canada closely resembles the United States in climate and physiography, toward the north the country rapidly grows colder, until, in the extreme northern portion, the climate is frigid. There the sea is frozen over in winter, and in summer it is covered with floating ice (Figs. 316 and 317). Even in midsummer large patches of snow are seen upon the land.

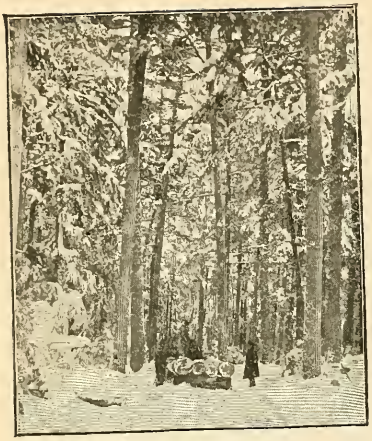


FIG. 209.

A winter scene in the woods of New Brunswick.

Lumbering. — The forests which cover northern Maine, New Hampshire, and Vermont extend into the hilly and mountainous section of New Brunswick and southern Quebec. In fact, from there westward to the Pacific, sweeping northward around the vast plains of Manitoba, this forest tract is from two to three hundred miles wide, and is estimated to include fully a million square miles. In the east the principal trees are spruce, balsam fir, pines, and maples, while in the west are spruces, mammoth cedars, sometimes sixty feet in circumference, and the Douglas fir, which in some instances attains a height of three hundred feet (Fig. 210). This forest is so nearly in its primitive state that there are few parts of the continent where the hunting for large game is so good.

Lumbering is carried on in much the same manner as in the United States (pp. 147 and 158). In the east the principal river down which the logs are floated to the sea is the St. John, upon which are situated FREDERICTON, the capital of New Brunswick, and ST. JOHN, the largest city in that province. In these two cities the logs are transformed into wood pulp and lumber. Immense quantities are shipped every year from the seaport of ST. JOHN.

FIG. 210.

One of the giant trees of British Columbia.

At present the woods of Canada are one of its greatest sources of wealth; the lumbering industry is so important that there are hundreds of sawmills at the rapids on the streams, and even in the great cities. Among the latter, OTTAWA, TORONTO, and MONTREAL are important, especially in the manufacture of lumber into such articles as doors, blinds, barrels, and furniture.

FIG. 211.

Boats setting nets to catch salmon off the coast of British Columbia.

Fishing. — It was the excellent fishing off the eastern coast of Canada that first attracted the French to America, and fishing is still an important industry in Canada. Fully fifty thousand people in Newfoundland and the eastern provinces, especially Nova Scotia and Prince Edward Island, are engaged in cod fishing. One of the best fishing ports is YARMOUTH in Nova Scotia, although a great deal of fishing is carried on from HALIFAX, Nova Scotia, ST. JOHN'S, Newfoundland, and many other places. Inland fishing is also important, for the streams and lakes still abound in trout, pickerel, white fish and salmon.

FIG. 212.

Hundreds of salmon in a cannery.

There is much fishing also on the west coast, especially for salmon. Great numbers of salmon come to the Canadian rivers every year to spawn, pushing their way up stream, in spite of many natural obstacles. Sometimes, in order to get beyond waterfalls, they must leap many feet into the air (Fig. 173), and it is interesting to watch the skill with which

they are able to spring out of the water and land in the foaming torrent at the crest of the falls. Sometimes they fail, but returning to the task, they try again and again until successful. It is believed that a salmon always returns to the same river.

While travelling up the streams they are easily caught in nets set across the current (Fig. 211), or by dip nets in the hands of fishermen (Fig. 173), or sometimes by salmon wheels (Fig. 174). Immense numbers of salmon are canned in western Canada (Fig. 212) as well as along the Columbia River and in Alaska.

Sealing. — We have already learned (p. 179) about the seal fishing in Alaska. Seals are also found on the eastern side of Canada, but their fur is of little value. It is the layer of fat, or blubber, just beneath the skin, that is chiefly sought, because it is useful in the manufacture of oil. The Labrador seals rear their young on the fields of floating ice that drift southward in the Labrador current (Fig. 317). To reach these animals, strongly built steamers (Fig. 316) start out from St. John's, Newfoundland, in the early spring, as soon as the ice has begun to break up enough for ships to push their way through. Upon reaching a group of seals, scores of men rush out upon the ice and kill as many as possible (Fig. 201); then they return to each body to remove the skin and blubber.

Agriculture and Ranching. — What was said about the agriculture and grazing of northern United States applies quite fully to Canada. The warm, damp winds from the Pacific render the climate of southern British Columbia much like that of Washington (p. 152) — an excellent one for wheat and hardy fruits.

Farther east, especially on the plains at the base of the Rocky Mountains, in the provinces of Alberta and Assiniboia, the climate is too arid for farming. Therefore, ranching is of importance, as in Montana and western Dakota (pp. 128 and 163). Immense herds of sheep (Fig. 213) and cattle are reared on these broad plains, in the midst of which are several towns. The largest of these is CALGARY, which has a population of about four thousand.

In Manitoba the climate begins to be more favorable for agriculture, and the wheat fields found in Minnesota and eastern Dakota continue across the boundary far up into that province. Although the winters are long and exceedingly cold, the summers are warm, so

that grain, especially wheat (Fig. 214), oats, and barley, may be raised there.

In the centre of this great wheat region is the city of WINNIPEG, in which flour is manufactured, as in Minneapolis, and from which much grain is sent eastward by rail. This city is situated on the banks of the Red River of the North, which empties into Lake Winnipeg. Find out from the map (Fig. 204) what other large river is tributary to this lake; also the name of its outlet.

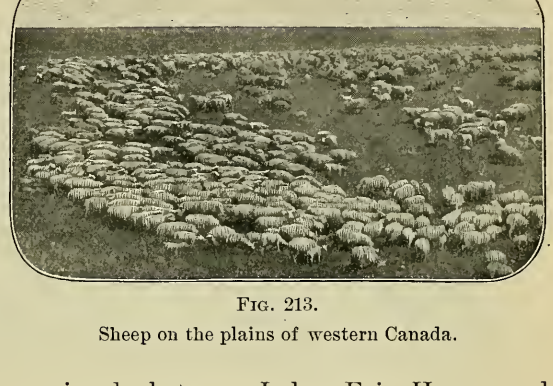


FIG. 213.
Sheep on the plains of western Canada.

Farther east, on the peninsula between Lakes Erie, Huron, and Ontario, is found the best farm land in Canada. This district is in the province of Ontario, the most populous of the Canadian provinces, which includes nearly half of all the people in Canada. More than two-thirds of the inhabitants live outside of the large cities. What large cities do you find there?

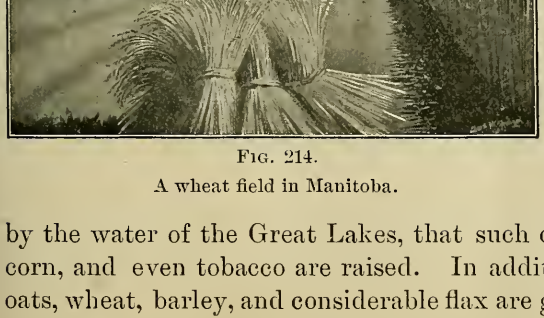


FIG. 214.
A wheat field in Manitoba.

Although this country is so far north, its climate is so modified by the water of the Great Lakes, that such crops as grapes, peaches, corn, and even tobacco are raised. In addition, great quantities of oats, wheat, barley, and considerable flax are grown there. The wheat is made into flour, mainly for home consumption; much of the barley is sent to the breweries of the United States; and the oats are fed to

stock. Some of the finest horses in America are reared in Ontario. This province is further noted for its great amount of cheese.

A strip of excellent farming country is found practically the entire length of the St. Lawrence River and along the southern shores of the Gulf of St. Lawrence. Prince Edward Island is an island of fine farms; but the people in the towns, especially CHARLOTTETOWN, the capital, are engaged in commerce and fishing. Portions of Nova Scotia and New Brunswick, particularly along the coast and in the valley of the St. John River, are also farming districts. In fact, one of the most beautiful farming regions in all of Canada is in southwestern Nova Scotia, noted for many crops, but especially for delicious apples. It was there that the French settlements were made about which Longfellow has written in his Evangeline; and this is often called "The Land of Evangeline."

Mining. — Gold and silver are mined in British Columbia, as in the Rocky Mountains farther south; but there has been far less development of mining in Canada than in the United States. Not only are there gold and silver, but also lead and copper ores, building stone, and coal. Deposits of coal are found both among the mountains and in the plains farther east.

The famous Klondike region is situated among the Canadian mountains near the Alaskan boundary. Although so near the Arctic Circle, DAWSON CITY in the Klondike has rapidly grown to a city with over 10,000 inhabitants. The discovery of gold so near the Alaskan boundary, thus causing that section suddenly to become of importance, has given rise to a dispute between the United States and Canada as to the exact location of the boundary line.

Gold and silver are found in the province of Ontario, especially in the vicinity of the Lake of the Woods. Nickel is mined in Ontario, and some oil fields have been developed. A small quantity of gold is obtained in Nova Scotia and in Newfoundland, where some copper is also mined.

In spite of the abundance of iron ore in certain places, the scarcity of coal near at hand has prevented Canada from producing much iron. The coal fields of western Canada are quite inaccessible to the eastern cities, and the coal beds of the east have never been thoroughly developed. In Nova Scotia, particularly on Cape Breton Island, there are extensive beds of bituminous coal of the same origin

and age as those of Pennsylvania. Recently great blast furnaces have been erected at SYDNEY, Cape Breton, leading to the development of an important iron manufacturing industry in the coal fields. Since these mines are on the very seacoast, and often on the shores of excellent harbors, the coal is readily loaded into ships; but the fact that the St. Lawrence is frozen in winter is a great disadvantage, not only to the cities along the rivers, but also to the coal mines.

FIG. 215.

A railway bridge across the St. Lawrence at Montreal, showing what a very broad river it is. Notice how small the long train of cars is when compared to the length of the bridge. There is no bridge across the river below Montreal.

Trade Routes and Cities. — There appear to be two outlets for eastern Canada, — one by way of the St. Lawrence, the other by the way of Hudson Bay. But the latter is practically useless because floating ice so clogs the narrow Hudson Strait that vessels are able to pass through it during only a few weeks of summer.

The St. Lawrence River suffers from the same disadvantage, though to a much less extent; and, in addition to the ice, there are dense fogs where the damp air from the Gulf Stream is chilled in passing over the cold Labrador current (Fig. 318). But in spite of these objections, the St. Lawrence offers a much better water route than that which has so greatly influenced the growth of New York (p. 83). However, New York has such a productive territory to draw upon, that it has grown far more rapidly than Montreal.

The exact location of MONTREAL (Fig. 205), the principal city in Canada, is easily explained. It is on the St. Lawrence, at the

mouth of the Ottawa River, and just below the Lachine Rapids which furnish a complete barrier to the passage of boats up stream. However, by entering the canals mentioned on page 197, river and lake boats may go up the St. Lawrence; but ocean vessels must stop at Montreal. Thus goods from Europe may be carried to Montreal, fully a thousand miles from the ocean; then, by transferring to other ships, they may be carried on canals, rivers, and lakes as far as Duluth, more than twelve hundred miles farther inland. By this means, and by railways also, raw products from the north, east, south, and west collect at Montreal, either to be manufactured, or to be shipped farther.

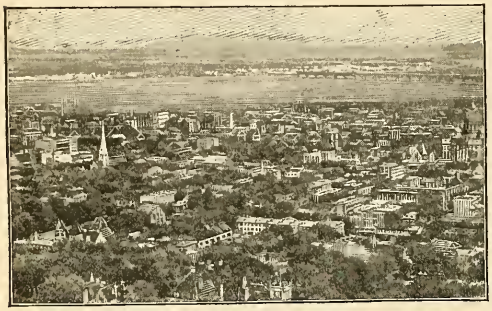


FIG. 216.

Looking down upon the city of Montreal, with the broad St. Lawrence in the distance.

As in the large cities of the United States, manufacturing in Montreal is varied, including the making of sugar, boots and shoes, cotton and woollen clothing, India rubber goods, various steel and iron products, cigars, and multitudes of other articles.

Farther down the river is QUEBEC (Fig. 205), a city especially noted on account of its historical associations. It was the centre of the French government in Canada, and for a long time the principal city. It is situated upon a high bluff of the St. Lawrence, and is fortified so as to command that river.

For a long time Quebec was engaged in commerce to a greater extent than Montreal; but the better location of the latter city has drawn the commerce away from Quebec, as the better situation of Boston drew the commerce away from Salem (p. 62). This has been greatly aided by the building of ship canals and by the dredging of the St. Lawrence, thus deepening the channel so as to admit great ocean vessels as far as Montreal.

Quebec is one of the quaintest and most interesting cities on the continent. It resembles a bit of the Old World, transplanted to America, and a visitor from the United States feels that he is indeed in a foreign country.

Besides trading and commerce, there is some manufacturing in Quebec, particularly the manufacture of boots and shoes.

Ottawa, another city of great importance, is above Montreal at some large falls in the Ottawa River. On account of its fine water power, Ottawa has much manufacturing, and is especially noted for sawmills and other lumber manufactories. More than that, being the capital of the Dominion, it has some beautiful government buildings, known there as the *Parliament Buildings* (Fig. 217).

The second city in size in Canada is Toronto, located on an excellent harbor on the shores of Lake Ontario. Being situated in

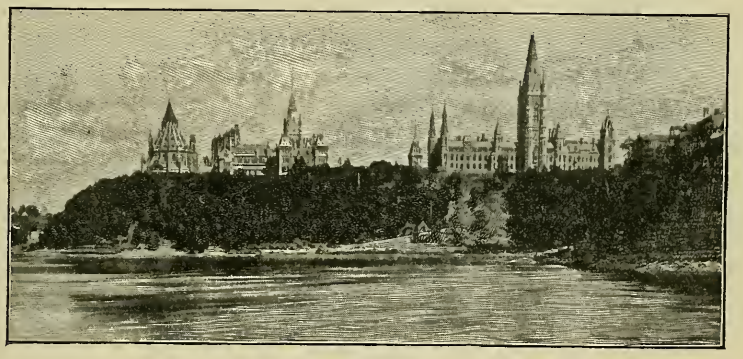


Fig. 217.
The Parliament buildings, Ottawa.

the midst of a fertile farming country, and having water connection with coal on the east, and lumber and other raw products on the west, Toronto has become a manufacturing centre. Yet, in spite of this, the inhabitants have paid great attention to keeping the city beautiful, and it is one of the most attractive cities on the continent.

A number of smaller cities are located along this water route. Port Arthur, which in position corresponds to Duluth in the United States, is a shipping point for grain, cattle, and other western products. Windsor (Fig. 139), opposite Detroit, shares some of the advantages of that city, being a shipping point and a manufacturing centre. Not far from Toronto, on the extreme western end of Lake Ontario, is Hamilton, a manufacturing and trade centre; and there are other cities on the same peninsula, the largest being London.

On the eastern end of Lake Ontario, near the Thousand Islands, is KINGSTON, which has cotton and woollen mills, car shops and locomotive works, besides being a lake port and railway centre. As in New England and New York, nearly all the towns and cities of this part of Canada are engaged in manufacturing of one kind or another.

Railways have been of great importance in Canada, as in the United States. The greatest railway is the Canadian Pacific, which reaches from St. John, New Brunswick, entirely across Canada, to VANCOUVER on the Pacific coast. It is the shortest route from England to China and Japan, and much freight is sent that way. Across the strait, on the island of Vancouver, is the city of VICTORIA. With what two cities on Puget Sound may these be compared? How do they compare in size? (See Appendix.)

One of the oldest cities in Canada, and one that has an excellent harbor, is HALIFAX in Nova Scotia, which is about the size of Mobile in the United States. The reason why it has never become very large is easily seen on examining the map (Fig. 204). There is almost no country back of it upon which it can draw to aid its growth. The narrow peninsula of Nova Scotia is not large enough to supply raw materials and manufactured articles in sufficient quantity to make it a great shipping point, and the country farther west is too difficult to reach. It is very much easier to send western goods to Montreal for shipment than to carry them so far as Halifax. Here, almost as well as in the case of New York and Montreal, we see why certain cities flourish or fail to flourish.

ISLANDS NORTH OF NORTH AMERICA

These cold and barren islands have almost no inhabitants. Scattered colonies of Eskimos are living along the coast (Figs. 28, 29, 202, and 203), many of them in almost as primitive a manner as when the continent was discovered.

These people have adapted themselves to life in the Arctic region in a way that is truly remarkable (p. 26). They have no wood excepting the occasional pieces which drift to their shores; they lack vegetable food, excepting the few berries that are found in

summer; and the land supplies them with almost nothing beyond a few birds and the caribou; yet they are able to exist, notwithstanding the terrible cold of the long, dark winter.

From the seal, polar bear, walrus, and caribou the Eskimos obtain not only their food, but furs for their clothing, skins for their *tupics*, or summer tents, and blubber for their light and fuel. In fact, excepting for the stones and snow used in their winter homes, or *igloos* (Fig. 29), and occasional pieces of driftwood, they are dependent entirely upon animals for everything they use.

FIG. 218.

A Greenland Eskimo mother and her two children, one carried in the hood of sealskin on her back (see also Fig. 28).

They are a happy and intelligent people. The latter fact is proved by the kinds of boats, sledges, and homes that they have invented, and also by the fact that they are able to live at all amid such surroundings. Their struggle for existence is probably greater than that of any other race. On the west coast of Greenland they are under the control of the Danes, who trade with them for skins, walrus ivory, blubber, and eiderdown. The most northern of the Danish trading stations is UPERNIVIK, where white men live farther north than any others in the world. But some uncivilized Eskimos have homes still farther north.

Away from the coast the greater part of Greenland is a barren waste of ice and snow — the most absolute desert known in the world (p. 9). Its area is about five hundred thousand square miles, or more than ten times as large as New York State. Throughout this area there is no living thing, not even the lowest plant or animal. In the interior, where the elevation is over ten thousand

feet, the temperature, even in midsummer, remains below zero, and rain never falls.

This snow forms a great ice sheet which moves out in all directions toward the sea ; and there the end of the glacier stands in the sea (Fig. 12); as it pushes out into the deeper water, great masses are broken off, forming icebergs (Figs. 12 and 202).

Review Questions and Topics. — (1) Tell about the French in Canada. (2) What provinces constitute the Dominion of Canada? Locate each. (3) What about Newfoundland? (4) Where do the majority of Canadians live? Why there? (5) Compare southern Canada with the United States in physiography and climate. (6) Where is some of the grandest scenery? (7) The best farm land? (8) Name and locate the principal rivers. (9) What is the principal water route? (10) Mention some of the difficulties of shipping by that route. (11) Describe the climate, physiogprahy, and vegetable life in northern Canada. (12) In regard to lumbering, tell about the extent of forest; kinds of trees; and cities most noted for lumber. (13) What provinces in the east are especially engaged in fishing? (14) Name the important fishing ports. (15) Tell about the salmon of the western coast. (16) Compare sealing in Alaska with that on the coast of Labrador. What use is made of the animals in each case? (17) Compare the agricultural products of Washington with those of British Columbia. Why so similar? (18) What is the principal occupation in Canada just north of Montana? Why? (19) Tell about the province of Manitoba. (20) Which is the most populous province in Canada? Why? (21) Where is "The Land of Evangeline"? (22) What mineral products are found in Canada? (23) Locate the chief mining regions. (24) Where are the leading coal mines? (25) Why is Hudson Bay not an important outlet for Canada? (26) How does the water route from the Gulf of St. Lawrence to Port Arthur compare with that from New York Bay to Duluth? Name particularly the advantages of each. (27) Give the reasons for the location of Montreal. (28) Mention the leading industries of that city. (29) Tell about each of the other cities mentioned. (30) Tell about the Eskimos. (31) What is the condition in Greenland.

Suggestions. — (1) Compare the area of Canada with that of the United States (Appendix). (2) The population also (Appendix). (3) Collect pictures of different kinds of trees in Canada. (4) Tell the story of "Evangeline." (5) Lake Ontario is how much higher than Lake Erie? How are ships able to pass from one lake to the other? (6) Explain why Montreal has outgrown Quebec. (7) Why should Buffalo grow more rapidly than Toronto? (8) Find some one who has been in Canada, and have him tell you what he has seen there. (9) Find out more about the government of Canada. (10) Of what advantage is it to England to have such a large, productive colony? (11) Write a story describing the pleasures of the Eskimos.

For References, see *Teacher's Book*.

XII. COUNTRIES SOUTH OF THE UNITED STATES

Mexico

Physiography and Climate. — Mexico consists of four areas of different altitudes. Near the seacoast are coastal plains and other lowlands. In the interior, occupying a large part of the country, is an arid plateau (Fig. 222). The third area includes the slopes between these two, and the fourth consists of peaks and mountain ranges which are a continuation of those in southern United States. Among the mountains, as in United States, there are a number of

Fig. 219.
A scene on the arid plateau of Mexico. A road bordered by cactus.

volcanic cones, two of them, Orizaba and Popocatepetl, being among the highest peaks on the continent.

This part of North America is narrow, and since the north and south divide causes some of the streams to flow eastward and the others westward, there can be no long rivers in Mexico. The steep slope from the plateau to the lowland gives the streams a rapid fall, so that they have cut deep canyons in the edge of the plateau. Moreover, the arid climate of the interior allows them little water. This

lack of large navigable rivers has interfered with the development of Mexico. Can you suggest why?

As in the case of our Southern States, the land has been rising instead of sinking. Therefore the coast is regular and there are few good harbors. Two projections form the peninsulas of Yucatan and Lower California, the former being a continuation of the mountain chain which made Cuba, Haiti, and Porto Rico. Lower California is a southern extension of the Coast Ranges of the United States.

If the surface of Mexico were near the sea-level, the climate of the greater portion would be tropical; but owing to the differences in altitude, there are several different climates. The low coastal plains, near Vera Cruz and in Yucatan, are hot and damp, being reached by the winds which blow across the Gulf of Mexico and Caribbean Sea. There is also considerable rain upon the cooler plateau slopes of eastern Mexico; but with the exception of these regions, the greater part of Mexico has too little rainfall for agriculture without irrigation.

History. — After Columbus discovered the West Indies, the neighboring coast was visited and settled, and thus the Spaniards naturally came into possession of Mexico. One of the boldest of the Spanish invaders was Cortez, who conquered the Aztec and Pueblo Indians as far north as northern New Mexico.

Spain found so much gold and silver in Mexico that many Spaniards settled there. They developed the mines, started coffee plantations on the temperate slopes, established farms on the plateau where irrigation was possible, and carried on cattle ranching in the more arid portions. The intermarriage of Spanish and Indians caused the population to become very much mixed; and there are now in Mexico not only savage Indians and semicivilized Aztecs, but many half-breeds, besides some pure-blooded Spaniards.

Spain governed Mexico so badly that the people rebelled, and in 1821 won their independence, establishing a republic with a government modelled after our own. There are a number of states, each with a government and capital, somewhat as in each of our states, and a central government with the capital at Mexico City, where

FIG. 220.

MAP QUESTIONS: *Mexico.*—(1) Describe the relief of Mexico. (2) Name the two large peninsulas. (3) What river forms a part of the northern boundary? (4) What waters border Mexico? (5) Find the capital. (6) Find the largest seaport. (7) Compare the coast line with that of northeastern United States.

Central America.—(8) Name the countries. (9) What sea lies to the east? (10) What large lake do you find? (11) Examine the small map of the Nicaragua Canal. Describe the route proposed. Of what advantage is the lake? Trace the route of the proposed Panama Canal.

the President lives. For a long time Mexico also included the states of Texas and Colorado and the country west of them to the Pacific. Texas won its independence by war and joined the Union; and by the Mexican war the United States obtained the territory marked "ceded by Mexico, 1848," in Figure 268.

Agriculture and Ranching. — Although the climate of a large part of Mexico is arid, much agriculture is carried on by the aid of irrigation, which is made possible by reason of the snow and rain among the mountains. On the irrigated farms the products of the temperate zone are raised, such as wheat, corn, and beans — the latter being one of the staple products of the Mexican diet. Much fruit is also produced, especially apples, pears, peaches, and grapes.

FIG. 223.
A Mexican ploughing with a wooden plough.

The Mexican farming methods, which are very crude, are a mixture of ancient Aztec customs and those introduced from Spain. In Mexico one may still see the wooden plough (Fig. 223), which barely scrapes the ground, and also the wooden-wheeled cart, drawn by oxen (Fig. 34).

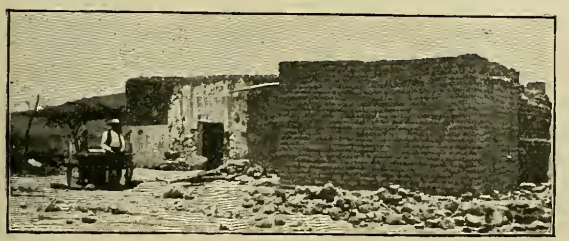


FIG. 224.
An adobe house in Mexico.

The home life of the people is interesting. Their houses have but one story and are commonly built of a brick made of clay mixed with straw, and then dried in the sun (Fig. 224). These sun-dried bricks, or *adobes*, are larger than the bricks that we use, and are piled tier upon tier, being joined by layers of mud. Often there is but one room (Fig. 221), the ceiling being made of brush, and the floor of nohting but the

earth or stones. In this one room the whole family cooks, eats, and sleeps. Their food usually consists of very simple materials, such as unraised bread, qaked in the fireplace, beans, and occasionally meat, commonly cooked with red pepper. Men, women, and children use tobacco.

While this description is true for the poorer classes, it of course does not apply to the wealthier class of Mexicans. Nevertheless even these have the same kind of architecture, which resembles that of southern Spain (Fig. 227), introduced into the latter country by the Moors many centuries ago.

Upon the arid plateaus, the plants resemble those in western United States (p. 21), and among them are found the sage bush, the mesquite, and the cactus (Figs. 24 and 219). One among them, known as the *maguey*, or *agave* (Fig. 225), is very widely used in Mexico. Its stout, sharp-pointed leaves rise from near the ground in a tuft. In the centre of this rests the flower stalk, which sometimes reaches a height of forty feet, and bears a cluster of white flowers on the top. It is also called the *century plant*, because it requires so long (from ten to seventy years) to reach maturity and produce this flower stalk. From the fermented juice of this plant the Mexicans obtain an alcoholic drink known as *mescal*, and by distilling it, a drink known as *pulque*. The tough leaves contain a fibre which is made into paper and strong thread. So valuable is the maguey that it is carefully cultivated upon plantations (Fig. 225).

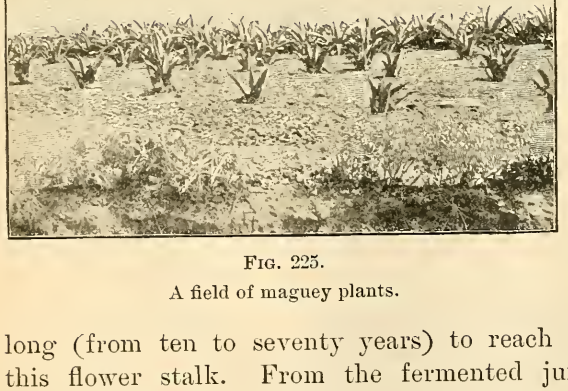


Fig. 225.
A field of maguey plants.

As in western United States, large parts of these arid plateaus cannot be reached by irrigating ditches. Such parts are valuable for cattle and sheep ranches. Horses and goats are also raised, but

neither horses nor mules are used so much in Mexico as in the United States. The most common draft animal is the little jackass, or *burro*, sometimes as small as a Shetland pony.

On the damp lowlands, rice, sugar-cane, and cotton are produced; also tropical fruits, such as oranges, bananas, and pineapples, quantities of which are exported from southeastern Mexico. Upon the slopes between the tropical lowlands and the temperate plateau much tobacco and coffee are raised.

The latter requires a rich soil, abundant moisture, a warm climate, and plenty of shade. In order to secure shade, the coffee bush, which reaches a height of from ten to fifteen feet, is planted in the shade of higher trees. A white blossom appears as early as March, and after the flower falls off the coffee berry begins to grow. It resembles a dark red cranberry. On the outside is a husk enclosing two kernels that fit with the flat sides together; and in order to prepare the coffee for the market the outside husk must first be removed. This is sometimes done by the Mexicans in a very crude way; but on the larger plantations, machinery is employed.

FIG. 226.
The coffee berry.

Southern Mexico. — In southern Mexico, near Central America, there are dense tropical forests from which are obtained many valuable woods, such as mahogany, rosewood, and logwood. Elsewhere in that country forests are rare, excepting upon the higher mountains. In fact there is so little forest land that the Mexicans living on the arid plateau find difficulty in obtaining wood for fuel. Much of this is dug from the ground; for some of the arid-land bushes, notably the mesquite, have long, thick roots which make excellent firewood.

Besides the valuable woods of the tropical forests, southern Mexico produces the vanilla bean, which grows upon a climbing plant. In the seed-pod are nestled the very fragrant beans which are used for flavoring extracts, for perfumeries, and for medicine. Pepper, made from the dried berry of a tropical plant, is also obtained in Mexico. Indigo, useful as a dye, is likewise obtained from a berry in this region, and sarsaparilla from the roots of a tropical plant.

The Mines. — One of the principal objects that the Spaniards had in exploring the New World was to obtain the precious metals, gold and silver; and both in Mexico and South America they were rewarded in their search by the discovery of very rich mines, some of them having been previously worked by the Indians. Mexico is still a great mining country, producing almost as much silver as the United States, and being therefore the second silver-producing nation in the world. There are also some mines of copper and lead.

Many of the mines are now operated by Europeans and Americans, so that modern methods have been introduced; but in some of those managed by Mexicans, primitive methods, similar to those used by the Indians, are still employed. Large areas have never been carefully examined for ore. In fact, some parts of the country are still occupied by Indian tribes, who not only prevent miners from coming in, but even defy the government.

Fig. 227.
The Mexican city of Leon.

The Cities. — While great numbers of Mexicans are engaged in farming and ranching, and are therefore scattered over the country, they have, wherever possible, gathered together in villages and small towns. These communities are often necessary in order to obtain the water supply needed for irrigation. It is usually too great a task for a single farmer to build a ditch ; and therefore a number combine and thus live close together.

In a few places, too, there are large cities, the greatest being Mexico City, with a population of about 350,000. In this city, as in numerous other places in Mexico, there are many fine buildings, especially cathedrals ; for the Mexicans, like Spaniards in other parts of the world, are chiefly Roman Catholics.

Another city in the interior is Puebla, founded in 1531, and now having a population about equal to that of Cambridge, Mass. It is situated near one of the ancient cities, or pueblos, of the Aztecs. San Luis Potosi is larger than Peoria, Ill., and there are a number of other cities with a population of fifty thousand and over.

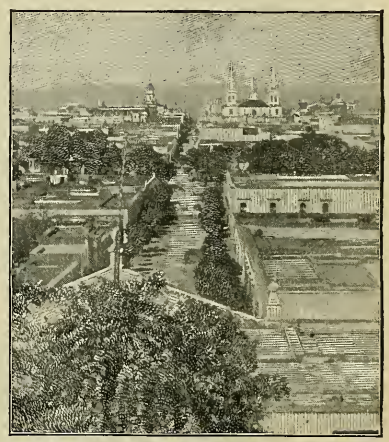


Fig. 228.

A view in Guadalajara, showing the typical one-story Mexican houses made of adobe.

Since the eastern coast of Mexico is low and sandy, it has no good harbors, the two largest cities on the seacoast being Tampico and Vera Cruz, whose harbors are protected by breakwaters. There are good harbors on the western coast, as that at Acapulco ; but since it is backed by high mountains and a worthless country, that port has never become important.

Because of the ignorance of the working class, and the absence of water power and coal, there is very little manufacturing in Mexico ; and that which is done is largely carried on by hand. There are large tobacco factories in the tobacco district. Some earthenware is also manufactured, and some cotton cloth; but there are no manufacturing towns, no great watch and shoe factories, and no immense blast furnaces, such as we find in many parts of the United States. But Mexico is now making rapid progress.

Central America

The Republics. — South of Mexico are five small nations, known as the Republics of Central America, each of which has a government modelled after that of the United States. They are, however,

not good examples of republics, chiefly because of the ignorance of the people. An ambitious general, obtaining a few followers, is liable at any time to start a revolution and overturn the existing government. There is an almost constant state of turmoil in these nations; war after war has occurred; presidents have been deposed or murdered; and such a state of unrest has existed that there has been little chance for development. Their political condition resembles that of the country in which they live, which is subject to disastrous eruptions of volcanoes, and to earthquakes of great destructiveness. They truly live in the midst of a state of unrest.

The earthquake shocks have levelled towns and killed thousands of people. For instance, SAN SALVADOR, the capital of the country by that name, was so frequently destroyed by earthquakes that the inhabitants decided to choose a new location for their city; but the one they selected is hardly better than the one they abandoned.

Most of Central America is mountainous; and, being in the tropical zone, the climate is hot. The rainfall is heavy, especially on the eastern coast, where it is so rainy that there are dense jungles along the shores of the Caribbean Sea.

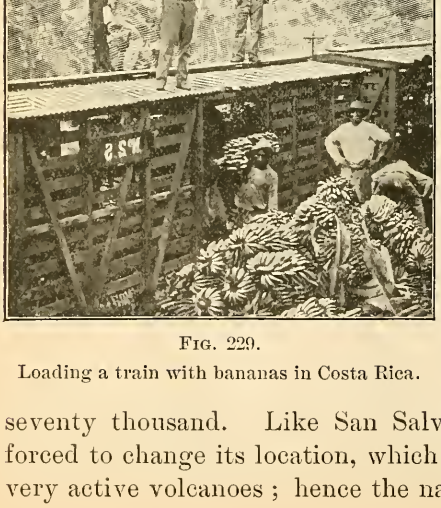


FIG. 229.
Loading a train with bananas in Costa Rica.

Of the five countries forming the Central American group, the smallest is San Salvador, the next, Costa Rica. Nicaragua, Honduras, and Guatemala are about equal in size. In addition to these, just south of Yucatan, is British Honduras (or Belize). The largest city in the group is NEW GUATEMALA, the capital of Guatemala, having a population of over seventy thousand. Like San Salvador, the inhabitants have been forced to change its location, which was formerly at the base of two very active volcanoes; hence the name, *New* Guatemala.

A large portion of these countries is occupied by dense tropical forests from which are obtained mahogany, rosewood, logwood, fustic, and other valuable cabinet and dye woods. The rubber tree also grows there, and the production of rubber is one of the industries of the region.

As in Mexico, coffee is raised on the hill slopes in the shade of the forest trees. One of the most important districts for this industry is Costa Rica. Bananas (Fig. 229), sugar, tobacco, indigo, and cocoa are other products of Central America.

Fig. 230.
Natives sorting coffee in Costa Rica.

Some gold and silver are obtained, the former near Bluefields, the latter in Honduras.

The inhabitants are mainly Indians, Spaniards, or half-breeds; and owing to the uneducated condition of the great majority, and even the uncivilized condition of many, there is practically no manufacturing carried on in these countries.

Canals. — To us one of the principal points of interest connected with this region is the building of canals across the narrow strip of land which separates the Atlantic from the Pacific. One canal has already been started between the towns of Colon and Panama on the Isthmus of Panama. The distance is only about fifty miles, and the elevation but three hundred feet at the highest point. This, the Panama Canal, has been especially supported by the French.

A second route favored for a canal, and one that has found favor in the United States, is the Nicaragua route, which is much longer, but passes over an elevation only about half as great as the Panama Canal. Moreover, a large part of the distance is occupied by a river and by Lake Nicaragua (Fig. 220), the largest lake in North America south of the United States. This lake is about ninety-two

miles long and empties into the Caribbean Sea through the San Juan River.

Either of the canals would be of great service to the seacoast cities of North America and Europe. By such a canal a steamer going from London to San Francisco would save five thousand miles, while eight thousand miles would be saved between New York and San Francisco. Examine a globe to see why more would be saved in the latter case.

The West Indies

(Map, Fig. 184, opposite p. 181.)

From the Yucatan and Florida peninsulas a chain of islands reaches to the mouth of the Orinoco on the South American coast. These islands enclose the Caribbean Sea; and, with the aid of the peninsulas of Florida and Yucatan, the Gulf of Mexico also. Because of the mistake made by Columbus, these islands are to this day called the West Indies. They are often known as the Antilles.

With the exception of the northern portion of the Bahamas, this entire archipelago lies within the tropics, and therefore has a warm climate; and all have a damp climate. There are many scores of islands in the group, only a few of which are large. Two of these, Cuba and Porto Rico, have already been described (pp. 181 to 185). Tell what you can about them.

Jamaica. — South of Cuba lies the Island of Jamaica, the third in size in the West Indies, and a possession of Great Britain. Its capital is Kingston, a city nearly as large as Portland, Me. This island is mountainous in the centre, but has an excellent soil on the lower slopes and in the valleys, and is very productive. The inhabitants are mainly negroes or mulattoes, there being fully forty negroes to one white person. The women do outdoor work fully as much as the men.

The occupation of the Jamaicans is chiefly agriculture. One of the main products is sugar-cane, which is made into sugar, molasses, and rum. Early vegetables and fruits, such as oranges and bananas, are also raised. Jamaica ginger, of which every one has heard, is obtained from the root of a plant that grows in this island.

Haiti. — The first large island discovered by Columbus in 1492 was Haiti, and on it he made settlements and opened mines. The descendants of the Spanish slaves have now become free, after a very complex history, and have set up two negro republics, Haiti and Santo Domingo. The capital of the former is PORT AU PRINCE; and of the latter, SANTO DOMINGO. Many of the natives obtain their living in the most primitive fashion, like the negroes of Africa; but others, especially near the seacoast, are engaged in raising sugar, tobacco, coffee, and bananas.

FIG. 231.
A field of sugar-cane in the West Indies (St. Croix).

FIG. 232.
A tropical scene in the West Indies (St. Croix).

Lesser Antilles. — Most of the islands among the Lesser Antilles are possessions of Great Britain, though some belong to other nations. For instance, Martinique and Guadeloupe belong to France; St. Thomas and St. Croix to Denmark; and

others to Holland. Many of these small islands are volcanic cones, built upon the crest of a mountain ridge which is mainly beneath the sea (Fig. 1). Most of the volcanoes now appear to be extinct, though in 1797 and 1843, in Guadeloupe, and in 1812, in St. Vincent, there were volcanic outbursts. Hot water and steam still rise from the craters in other islands, showing that the volcanic fires have not altogether died out.

The products of these islands are similar to those of the other West Indies, the most important of all being sugar-cane.

The Bahamas. — North of Haiti and Cuba are several hundred small islands, called the Bahamas. A number of these are inhabited, and on one is situated the city of NASSAU. These islands have been built by coral polyps. In the warm waters of the Gulf Stream, which sweeps over the shallow bank on which the islands lie, these minute sea animals have built reefs. Waves have washed the dead coral fragments together, forming bars and beaches, and the wind has blown the coral sand into low sand-dune hills. In this way the islands have been made.

Sponges are obtained from the clear, warm waters of the Bahama banks. To obtain them, the natives either cruise about in boats, dragging the bottom, or they strip off their clothes and dive into the clear water, tearing the sponge from the bottom to which it is clinging.

From the land, early vegetables, pineapples, oranges, and cocoanuts are raised by the inhabitants, who are chiefly negroes. One of the industries on these islands is caring for winter visitors. Why should people wish to go there?

THE BERMUDAS

Far out in the Atlantic, alone in mid ocean, and 600 miles east of the Carolines, is a cluster of small islands, known as the Bermudas, the largest being only 15 miles long by one or two miles in width. Being in the open ocean, and surrounded by warm currents, the Bermudas have a delightful and equable climate. In midwinter, when people in the same latitude in the United States are shivering with cold, those in Bermuda are able to sit out of doors late at night.

This group of islands, which belongs to Great Britain, is inhabited mainly by negroes and mulattoes, who are engaged in raising early vegetables, especially potatoes and onions, for the American market. Another important product is the Easter lily, great fields of which are raised for the Easter season. It is natural that many persons from the United States should be attracted to such a climate every winter. The majority of these visitors stay in the largest city, HAMILTON.

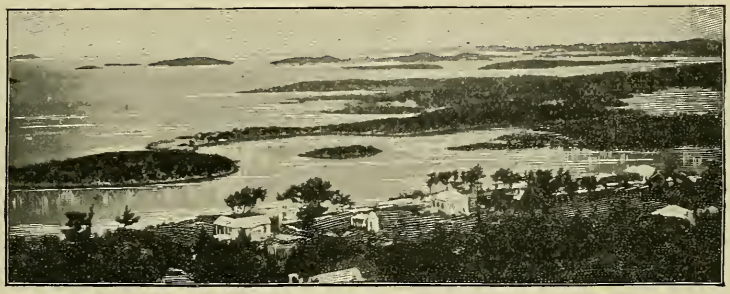


FIG. 233.

A view from one of the coral sand hills, showing some of the tiny islands of the Bermuda Group.

REVIEW QUESTIONS AND SUGGESTIONS

Mexico: QUESTIONS. — (1) Describe the surface of Mexico. (2) Why are there few good harbors? (3) Tell about the temperature and rainfall in the different parts. (4) Give the history of Mexico: — the early settlement; the industries developed; the present government; the loss of territory. (5) Mention the leading products from the irrigated farms. (6) Tell about the methods of farming. (7) About the home life. (8) Name some of the plants on the arid plateaus; what products are obtained from the maguey? (9) What are the chief products on the damp lowlands? (10) On the slopes farther inland? (11) Tell about coffee raising. (12) In what part of the country are the forests? (13) Name the valuable woods. (14) Name the products of southern Mexico. (15) Tell about the mining of precious metals. (16) Locate the principal cities in the interior; on the coast. (17) Why is there little manufacturing? (18) What kinds are there?

SUGGESTIONS. — (19) Find out why coffee raising requires special care. (20) Find an article of furniture made of mahogany. (21) Walk toward Mexico City. (22) What reason can you give for its location? (23) Compared with water routes, are railways more or less important in Mexico than in the United

States? Why? (24) Collect pictures of Mexican scenes. (25) Find some one who has been in Mexico, and have him tell you about it. (26) Who is the President of Mexico? (27) Make a sketch map of Mexico.

Central America: QUESTIONS. — (28) Name the five nations in Central America. (29) To whom does Belize belong? (30) What about the earthquakes in Central America? (31) Describe the climate. (32) Locate the leading cities. (33) What products of Mexico are also found in Central America? (34) On the map locate the canal that has been begun across the Isthmus of Panama. (35) Where is it proposed to start another? Give reasons in favor of each.

SUGGESTIONS. — (36) What disadvantages do you see in the lack of a central government for all the Central American republics? (37) In what other ways besides saving coal would a canal there prove of advantage? Let a committee be appointed from your class to obtain definite facts about the matter by writing to some ship company. (38) Why would harbors at each end of the canal be necessary? (39) Make a sketch of Central America.

The West Indies: QUESTIONS. — (40) Into what groups are the islands divided? (41) Tell about their climate. (42) What can you say about Jamaica? (43) What two republics on the island of Haiti? Name their capitals. (44) What are its products? (45) How have most of the Lesser Antilles been formed? (46) What is their principal product? (47) How have the Bahama Islands been built? (48) Name some of the products of the islands.

SUGGESTION. — (49) How does each of the four largest islands compare in area and population with New York State? (See tables in Appendix.)

The Bermudas. — (50) For what are they important?

For REFERENCES, see *Teacher's Book*.

XIII. REVIEW OF NORTH AMERICA

Physical Geography. — The natural advantages that North America possesses as a home for man have been the result of slow changes extending through millions of years. How have the mountains been brought into existence? (p. 2) and where are the principal chains? How was coal formed? (p. 2.) What portion of the continent was covered by the glacier? (Fig. 11.) What work of advantage to us

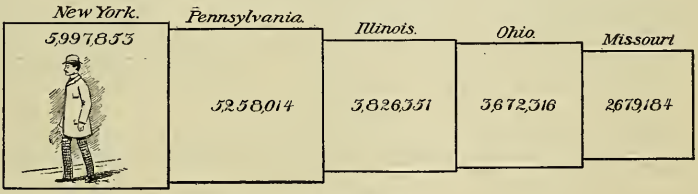


Fig. 234.

The five states having the greatest population. In this and all the other similar figures the relative importance of the states is indicated by the area of the squares.

did it accomplish? (pp. 9–13). In what ways is the more recent rising or sinking of the coast of importance? (p. 13.)

How do the animals and plants of North America vary? (pp. 19–25.) Describe the manner of life among the Eskimos (p. 26); among the Indians (p. 26). What European nations endeavored to obtain possession of large sections of this continent? (pp. 29–31.) Give some reasons why the English succeeded most fully (pp. 31–33).

Population. — At the present time there are probably more than a hundred million people living in North America, distributed among the four greater sections as follows: Central America, over three million; Canada, fully six million; Mexico, over thirteen million; and the United States (not including dependencies), more than seventy-six million. From these figures it is evident that about

three-fourths of all the inhabitants of the continent are living in the United States. Figure 235 shows the density of population in the

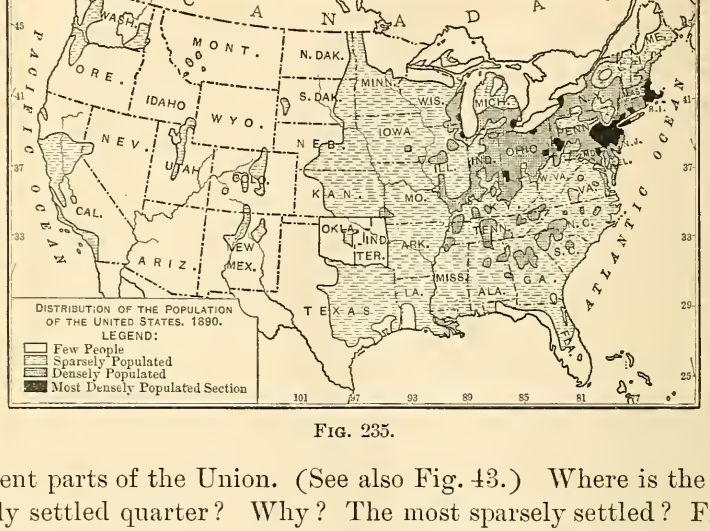


FIG. 235.

different parts of the Union. (See also Fig. 43.) Where is the most thickly settled quarter? Why? The most sparsely settled? Figure 236 gives the location of the cities, the largest having the largest

FIG. 236.

The star shows the centre of population of the United States.

dots. In the Appendix is a table of the largest cities. Find the dot (Fig. 236) that represents each large city and give its population. In what respect are these two figures (235 and 236) alike?

FIG. 237.

On these maps the spaces left blank indicate either little or no production.

City and Country.— The great cities are so numerous, and are so often mentioned, that there is danger of over-estimating their importance as compared with the country. At the time of George Wash-

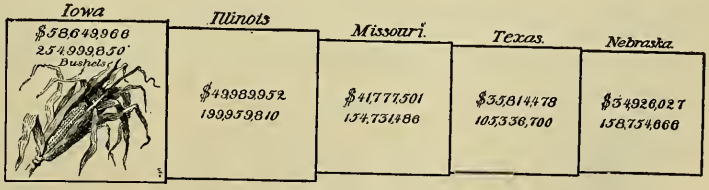


FIG. 238.

Corn production, in dollars and in bushels, in the five leading corn-producing states.

ington very few people lived in cities. Even at the present time about two-thirds of our seventy-six million inhabitants live either in the country, or in towns with a population of less than eight thousand. In Mexico and Canada the proportion living in cities is

still smaller. In other words, the great majority of persons in North America are country people.

Country. — The leading occupations of those living outside of the cities have already been studied. AGRICULTURE is the most

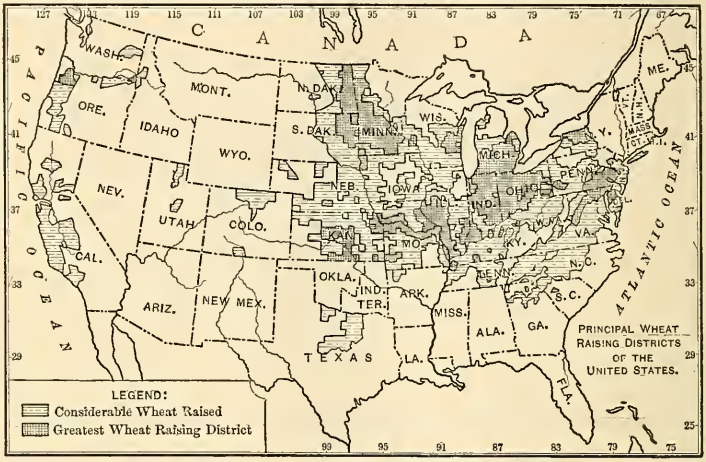


FIG. 239.

important of all. At the present time there are over five million families occupying farms in the United States. About how many persons does that represent? Why should so many people live on farms?

Figure 237 shows the regions that are extensively engaged in raising corn. What states are included? In 1898 nearly two bil-

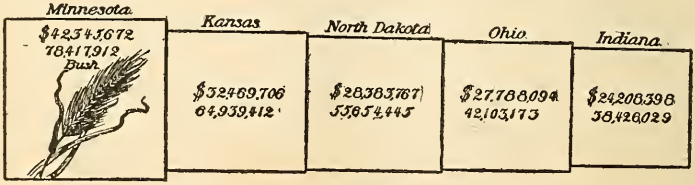


FIG. 240.

Wheat production, in dollars and bushels, in the five leading wheat-producing states.

lion bushels were produced; how many is that to each of our inhabitants? How is corn cultivated, and what are its uses? (p. 123.)

Many of the states that raise corn are also extensively engaged in the wheat industry. Figure 239 shows the wheat regions. Tell about wheat in the valley of the Red River of the North, and about the Dalrymple farm in particular (p. 126). Wheat and corn are our most valuable food crops. What other grains can you mention, and for what is each used?

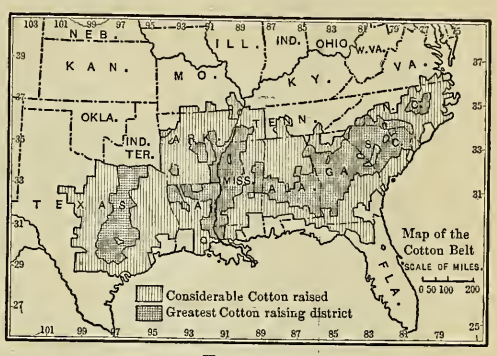


FIG. 241.

The cotton belt is confined entirely to the southeastern portion of the country, as shown in Figure 241. Why? Name the principal cotton-raising states. Tell about the growth

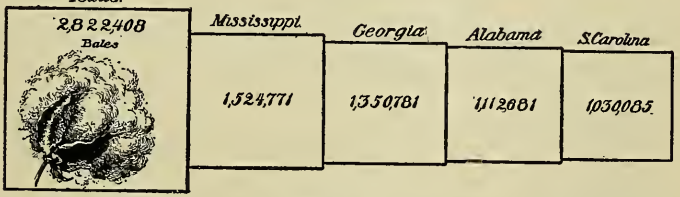


FIG. 242.

Five principal cotton-producing states.

and uses of cotton (p. 100). Where in these states are sugar and rice grown? How is the work carried on? (pp. 103106.)

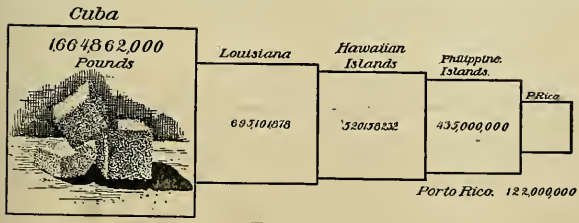


FIG. 243.

Principal sugar-producing districts in the United States and its dependencies.

According to Figure 244 what states are largely engaged in tobacco growing? What is the appearance of the plant, and how is it cultivated? (p. 72.)

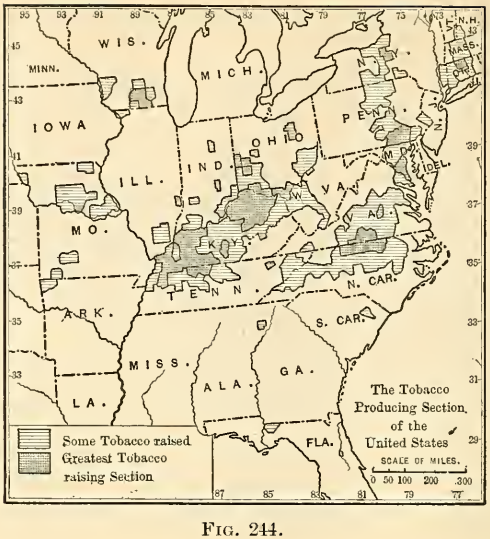


FIG. 244.

Following are three figures showing the principal states from which some of the other important farm products come.

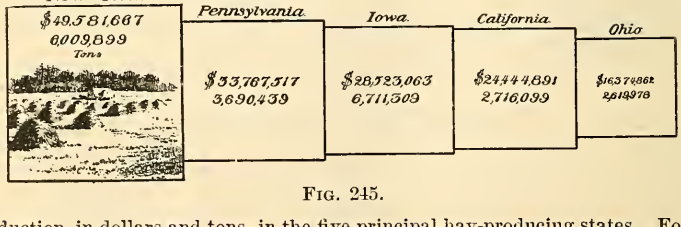


FIG. 245.

Hay production, in dollars and tons, in the five principal hay-producing states. For what is hay used.

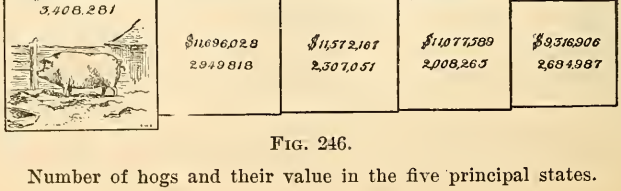


FIG. 246.

Number of hogs and their value in the five principal states.

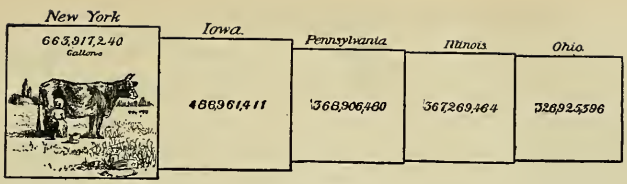


FIG. 247.
Five principal milk-producing states.

FIG. 248.

MINING is a second industry which confines people largely to small towns and to the country. About four hundred thousand men are employed at it. How many different metals can you name? How many other products can you mention that are obtained from underground?

Of them all, the *fuels* are probably the most valuable. Why? What kinds are there? Figure 248 shows how extensive the *coal-beds* are. Name the states in which the greatest quantities of coal are mined. Of what impor-

FIG. 249.

Coal production, in dollars and tons, in the five leading coal-producing states.

tance is it that there are coal-fields in so many parts of the country? What kinds of coal are there? And what are the differences between them? (pp. 3–4.) Describe a coal mine (p. 77). What are the uses of coal?

Name the chief states in which petroleum and natural gas are found. Tell also how they have been produced during the past ages and what their uses are (p. 173).

The ores producing iron are among the most important of the mineral products. Why so important? Where are the principal iron-producing regions? (Fig. 251.) How is pig iron made? (pp. 79–81.) Why is not the Lake Superior district a favorable place for smelting iron ore?

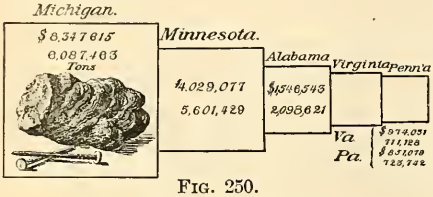


FIG. 250.

Iron ore production, in dollars and tons, in the five leading iron ore-producing states.

Among the metals of great importance to man are the precious metals *gold* and *silver*. Describe three methods of gold mining (pp. 155–156.) Tell about gold and silver mining in California and Colorado (pp. 155–157). In what other parts of our country are the precious metals found?

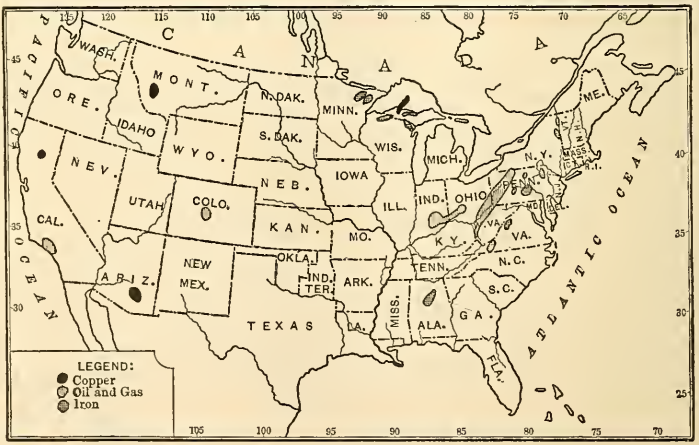


FIG. 251.

Leading iron, copper, oil, and gas-producing regions.

FIG. 252.

Gold and silver-producing regions indicated by crosses.

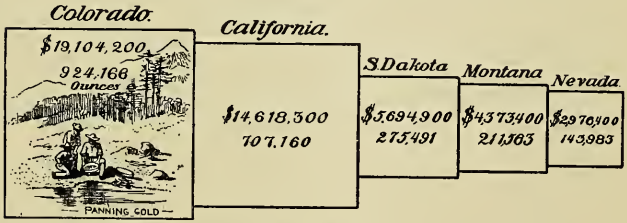


FIG. 253.

Gold production, in dollars and ounces, in the five leading gold-producing states.

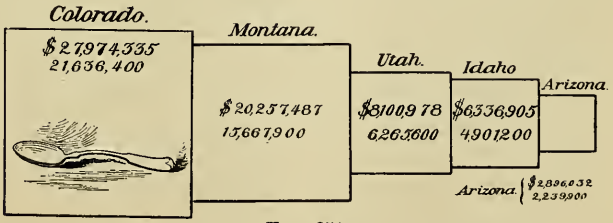


FIG. 254.

Silver production, in dollars and ounces, in the five leading silver-producing states.

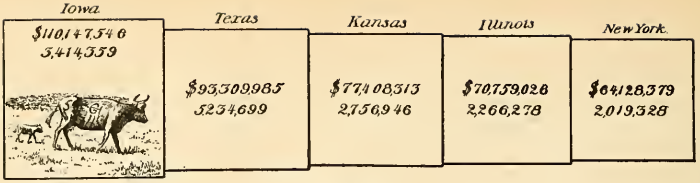


FIG. 256.

Number of cattle and their value in the five principal cattle-producing states. Many of these are kept, not on ranches, but on farms in the Eastern states.

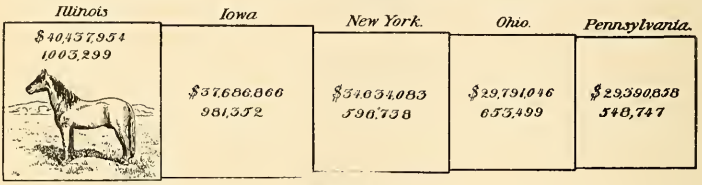


FIG. 257.

Number of horses and their value in the five principal horse-producing states.

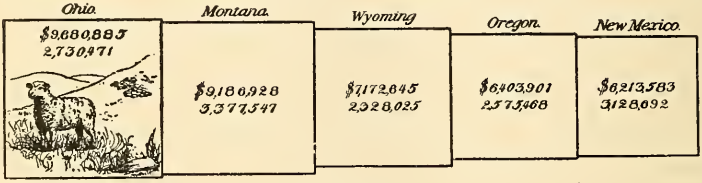


FIG. 258.

Number of sheep and their value in the five leading sheep-producing states.

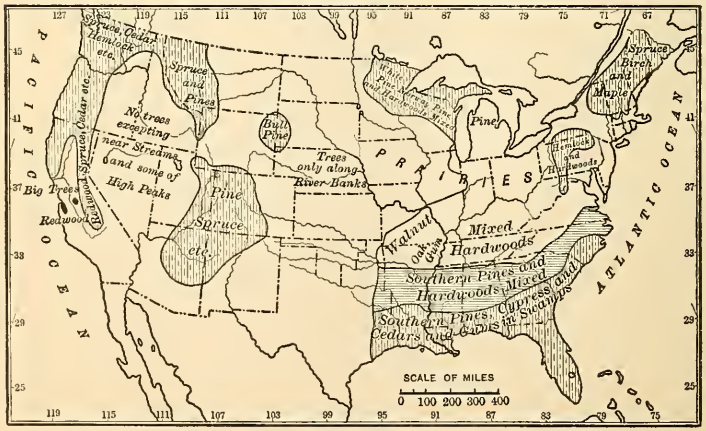


FIG. 259.

Maps showing the regions from which considerable timber is now being obtained

(Figs. 252–254.) What two sections are most noted for copper mining? (Fig. 251.) Tell about that industry in each section (pp. 135 and 157). Where and how is stone quarrying carried on in New England? (pp. 50–52.) How is salt mining carried on in New York? (p. 74.)

GRAZING is a third important rural occupation. Point out on the map (Fig. 46) the portions of the country largely given up to it. Why these? Relate how cattle ranching is carried on (p. 128); also sheep ranching (p. 164). Which states are most important in these industries? (Figs. 256–258.)

LUMBERING is a fourth great industry that attracts people to the country. Figure 259 shows the distribution of the forests. Describe the industry as it is carried on in Maine (p. 46). In the Southern States (p. 98). In Michigan (p. 130). In the Northwest (p. 157). Why these differences? Which are the most common kinds of trees? What are the products of the forest besides lumber? (pp. 50 and 99.)

FIG. 260.
Sections where ocean fish are found.

FISHING is a fifth prominent occupation outside of cities. In what sections is it especially important? Describe how codfishing is carried on (p. 54); salmon fishing (p. 173); the oyster industry (p. 70).

Altogether, therefore, there are five industries that lead the greater part of the inhabitants of the United States to live in small towns or in the country. Name these occupations. They furnish us with the raw materials for *food*, *clothing*, and *shelter*. What raw materials enter into each, and whence does each come?

Cities. — What are the principal occupations in the cities? The answer has been repeatedly suggested. What, for instance, are the main kinds of business in Duluth? (p. 137.) In Minneapolis? (p. 142.) In Chicago? (pp. 138–141.) In Buffalo? (p. 85.) In New York? (p. 86.) In Baltimore? (p. 91.) In San Francisco? (p. 171.) Tell what is done in various cities with grain, ores, hides, cotton, wool, lumber, and fish.

It is evident that one of the principal occupations in cities is MANUFACTURING. Where, for example, is the making of iron goods especially important? Tobacco? Sugar? Paper? Farming implements? Furniture? Freight and passenger cars? Cotton cloth? Woollen cloth? A single large factory may employ thousands of workmen (p. 61), and where hundreds of factories are established, as in New York, Chicago, and Philadelphia, there must be an enormous population. More than five million persons are engaged in manufacturing in the United States.

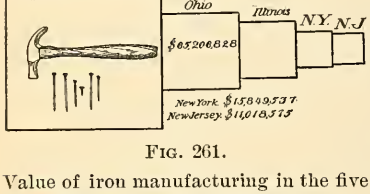


FIG. 261.

Value of iron manufacturing in the five leading iron-manufacturing states.

A second great occupation in cities is that of BUYING and SELLING. Although grain, cotton, wool, etc., are produced in immense quantities in the country, they are not generally bought and sold there. That work must be carried on where there are great numbers of people; for where else could it be done so successfully? If a person living in a city should want only a bushel of potatoes, he would not go to a farmer for them, but to a store to which many other people also go to buy goods. So also, if you were a farmer in Illinois and wanted to buy a carload of cattle to fatten, you would not go out West to a cattle ranch, but probably to the stock yards at Chicago, where many cattle are always to be found. Or if you had a quantity of cotton to dispose of, where else could you do it better than in some city where cotton is bought and sold, as in New Orleans or Memphis? Not only must there be *stores* where we can buy what we need, but there must also be *centres*, or cities, where goods may be bought and sold on a still larger scale. A city bears much the

same relation to the country round about that a store does to the people who live near enough to trade there.

Since enormous quantities of raw material must be shipped into the cities for the manufacture of goods, and since most of the finished articles are sent away, the business of SHIPPING, or TRANSPORTING, is a third great occupation in cities. Tens of thousands of men are employed in loading and unloading cars, boats, and wagons.

In this country fully four million persons are employed in buying, selling, and transporting, or in COMMERCE, as these kinds of business together are called. What raw products are taken to Detroit, and what finished products are taken away? Answer the same in regard to Milwaukee, Peoria, Louisville, Providence, Denver, and New Orleans. If your home is in the city, answer the same for that; if not, for the nearest city.

Thus there are three leading occupations in cities; namely, MANUFACTURING, TRADING, and TRANSPORTING. Every city has all three; but some that are particularly distinguished for the first are known as MANUFACTURING CENTRES; and others, distinguished especially for the second, are known as TRADE CENTRES. Minneapolis is an example of the former, and St. Paul of the latter. Give other examples of each. Those cities, like Boston, New York, Philadelphia, Baltimore, Chicago, San Francisco, and Montreal, whose location is especially favorable for the shipment of goods, are great COMMERCIAL CENTRES, and usually also manufacturing centres. Why?

The relation between country and city is now clear. Nearly one-half of our men are engaged in obtaining raw materials, and the remainder are mainly engaged in manufacturing them into useful articles, in buying, selling, and transporting them. Show by numerous examples how neither class can well do without the other.

But while they are so dependent, the life of one is very different from that of the other. Recall farm life as described on page 120. What idea have you formed of farm life on southern plantations? Of the miner's manner of living? The ranchman's? (p. 130.) The lumberman's? (p. 47.) The fisherman's? (p. 53.)

Recall, on the other hand, what was said about life in New York

City (p. 000). Give your idea of factory life. Of life in trade and transportation.

What attractions and objections do you find in each of these several occupations? Is the work of a farm hand more or less narrowing than that of a factory hand? Why? Suppose that two young men are much alike in ability, disposition, and training; how are they liable to grow unlike if one chooses mining for an occupation, and the other chooses trade? Give other instances showing how the work that one follows influences his manner of life and development.

It is difficult to determine which occupation requires the hardest work, for success demands one's best effort, no matter what the occupation may be. But of those living in the city on the one hand, and in the country on the other, which are more certain of the ordinary necessities of life? Why? Which have more comforts? Why? Which are more independent in general? Why? Which have the better opportunities for amusement? Why? For education? Why? For homes with plenty of light and fresh air? Why?

For many years the population of cities has been increasing more rapidly than that of the country, which suggests that people are preferring city to country life. Can you give any reasons for this in addition to those already mentioned?

Dependence of Different Sections upon one Another. — No one locality produces all of the materials needed there. Which of your foods are not raised near your home? How about the knives, forks, dishes, and spoons? How about the clothes that you wear?

Because of the climate, water power, soil, or for some other reason, each part of the country is especially fitted for producing one or several things, as eastern Kansas for grain, and western Kansas for stock, northern Maine for lumber, etc. Indeed, most of the articles used in each part of the country must be brought from other places. Name the materials that the Montana ranchman needs from the Southern planter; from New England; from Minneapolis and Chicago. Upon what parts of the United States are the inhabitants of Florida dependent? What do they supply in return? Make a list of the materials used in the construction of your house, and, as far as possible, determine where each one may have come from.

The different parts of the country are of vital importance to one another, much as different parts of the body are.

Relation to our Territories and Dependencies. — Despite our broad territory and enormous number of products, there are some necessary articles that are either entirely lacking, or cannot be produced in sufficient quantities within our own borders. Name a few (see table of imports in Appendix). Mention some that we are therefore glad to receive from Alaska, Cuba, Porto Rico, the Hawaiian Islands, and the Philippines. Mention others that they likewise are glad to receive from us. State, then, how the United States and its dependencies are of advantage to one another.

Other Countries of North America. — The principal industries in southern Canada and Newfoundland are necessarily similar to those in the northern United States. What about agriculture there? (p. 201.) Where is coal mined? (p. 203.) Precious metal? (p. 202.) What about grazing? (p. 200.) Lumbering? (p. 198.) Fishing and sealing? (pp. 199–200.) Compare the raw products of southern Canada with those of our Northern States. Name and locate the principal cities; the leading trade route. Mention the chief kinds of manufacturing. (For above, see pp. 203–206.)

Describe the surface of Mexico (p. 209). The climate (p. 210). What are the agricultural products from its arid plateaus? (p. 211.) From its lowlands? (p. 213.) From the slopes between? (p. 213.) Tell about the forests of Mexico (p. 213). The mining (p. 214). Give some reasons why there is little manufacturing in that country (p. 215). Locate the principal cities.

Name the five republics of Central America. Describe the surface of the country and the climate (p. 215). Name the principal industries (p. 217). Tell about canals across the isthmus (p. 216). Mention the largest islands among the West Indies. What are their chief industries? (pp. 218–220.) What industries in the United States are not found in Canada? In Mexico? In Central America? What industries in any one of the latter countries are not found in the United States?

Our Relation to Other Countries. — The United States, like one small locality, produces far more of some materials than we can con-

sume, while other important articles must come wholly, or in part, from abroad. Give examples of each. If we could not secure a market for our products in foreign lands, we should suffer seriously; and, if the foreign countries could not be induced to provide us with what we need, we should suffer again. Other countries are in the same condition. Show how that is true of Canada; of Mexico. There is excellent reason, therefore, for a constant exchange of goods among the nations of the world. How does the size of our country give us a great advantage in this respect?

We sell more goods to Great Britain than to any other foreign land. In fact, hundreds of millions of dollars' worth of cotton, wheat, flour, cattle, corn, meat, and oil are sent to that country every year (see table of exports in Appendix). We receive in return, large quantities of woollen, cotton, and rubber goods, and articles made of vegetable fibres, hides, and skins (see table of imports in Appendix). Trade is carried on in the same manner with Germany, France, and other countries. The goods that we send forth are called *exports*, and those brought in, *imports*. Examine the tables of exports and imports in the Appendix to see what we send away and receive, as well as the countries with which we trade.

More than half of all our exports and imports are sent by way of New York alone. Why? Other ports, next in importance, are: Boston, Baltimore, Philadelphia, New Orleans, Galveston, and San Francisco. The total value of our exports in 1898 was $1,231,482,330; of our imports, $616,049,654.

Some imports are permitted to enter the country free; but upon most of them there is a *duty*, that is, a charge for the privilege of entering the country. This duty is a source of income or *revenue* for the government. It is also intended to serve as a protection to home industries by preventing foreign products from being sold in our country at a lower rate than we can produce them. However, it sometimes causes considerable hardship. For example, a citizen of the United States, living even on the very border of Canada, cannot buy from that country such articles as lumber and wood pulp without paying a duty upon them. This causes us to pay a higher price for some articles than we would have to pay if no duty were placed upon them. Therefore, the boundary line between two neighboring countries is often of real importance as a barrier to free trade.

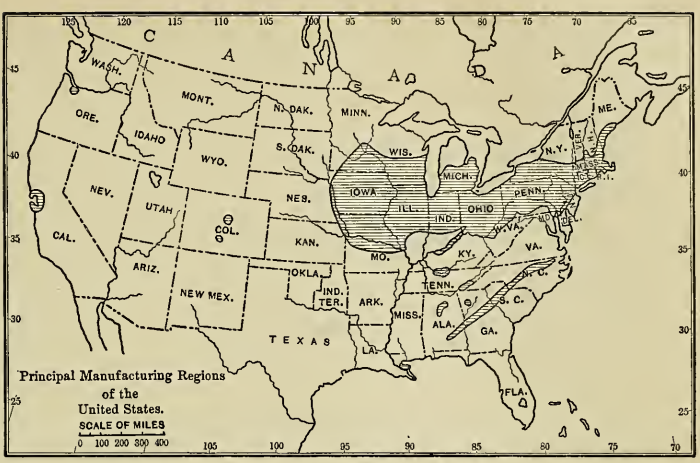


FIG. 262.

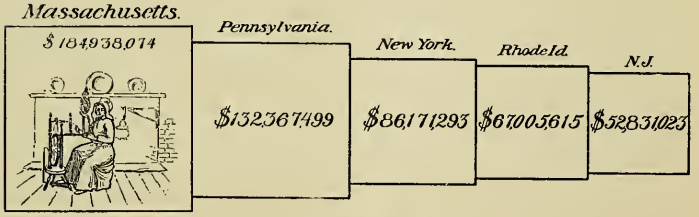


FIG. 263.

Value of the manufacture of textiles (cotton, wool, etc.) in the five leading textile manufacturing states.

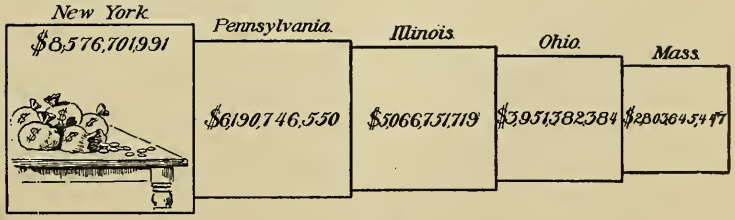


FIG. 264.

Wealth in dollars of the five wealthiest states.

FIG. 266.

Navigable rivers represented by heavy lines.

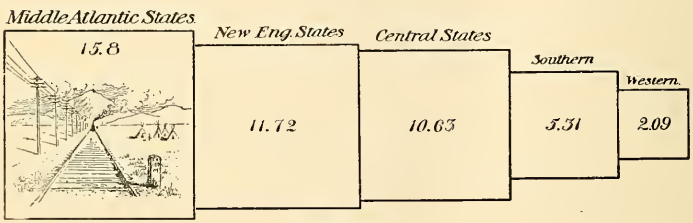


Fig. 267.

The figures represent the number of miles of railway for every one hundred square miles of territory in each of the five groups of states.

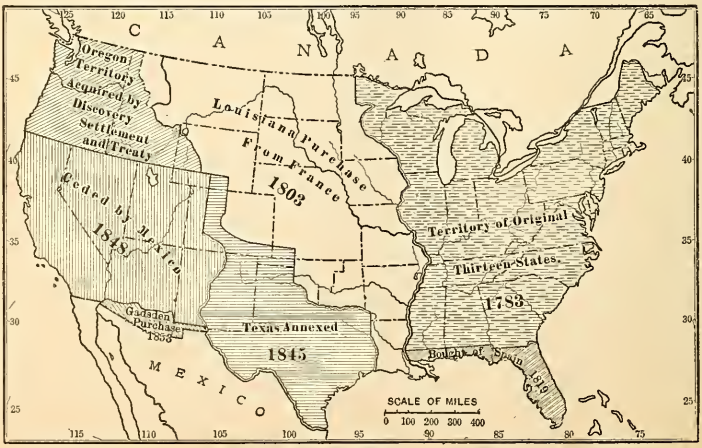


FIG. 268.

Map to show when and how the United States obtained its territory.

Transportation Routes. — The chief inland water routes for transportation of goods have often been mentioned (Fig. 266). What are they? About twice as much freight is carried over the Great Lakes as on the Mississippi system. Mention some of the principal kinds carried on each. The fact that the Great Lakes system extends so far east and west is of great importance. This route, by furnishing a cheap means of transportation to the Eastern coast, opens up a very productive region in a favorable, temperate climate. Upon reaching the coast these goods may readily be shipped to Europe, our principal foreign market.

It is largely because of these facts that most of the people of the country are living either along the northeastern coast or else from there westward to the Mississippi. On Figure 236 find the centre of population in the United States.

Figures 255 and 265 show an enormous number of railways in the United States. They now carry fully three times as much freight as all the water routes together. In what part of the country are most of them found? Why there? Which quarter is next best supplied with them? Which portion has fewest lines? How does the location of lines on this figure compare with the location of cities on Figure 236? What about the *direction* of a majority of the railway lines? Count the number of railways that reach east and west across the western half of the continent (Fig. 255). In what city on the Pacific coast does each of these terminate?

Influence of Steam and Electricity.—The steam used upon the waterways and railways has been one of the most powerful factors in populating and developing our country. A century ago it required two days to travel from New York to Philadelphia, and six days from New York to Boston. In the latter case only two trips per week were made by stage. The journeys were not only very tiresome, but were also filled with hardships, and often with dangers. There were but thirteen daily papers in the United States, and neither papers nor books could be sent by mail. Letters cost from six to twenty-five cents, according to the distance, and, as the expense of carrying them was so great, they were not sent from the smaller towns until a number were collected.

Now we can travel as far in an hour as formerly in a day, and with much more convenience. There are fully two thousand daily papers, and these, as well as letters, may be sent quickly and cheaply to every section of the country. We can even send a telegraph message to a distant point in an instant, and can talk by telephone with a person hundreds of miles away, even recognizing the tones of his voice. To one of our ancestors of a century ago either one of these wonders, to which we are now so accustomed, would have seemed an utter impossibility.

Influence of Modern Inventions on Mode of Life. — The effect of such a mighty change is seen in every direction. Each year thousands of carloads of fruit are shipped to Eastern cities from California. If there were no railways, how could it reach these cities? What, then, would be the effect on southern California? Also, how could the corn of the Central States be marketed? And how could furniture, sugar, etc., be brought to the Western farmer's door? Trace other results of this change.

If we were suddenly deprived of our quick transportation, within a few days there would be a famine in every large city. Even now, when heavy falls of snow block the trains for only a day or two, the supply of milk, meat, and other necessities quickly runs low, and the prices rise to several times their ordinary value.

If we had no railway trains, there might also be extensive famines from time to time over large areas of country, as there were in Europe in the olden times, and as there are even at present in China. Why especially in China? As it is, however, hundreds of articles of food and clothing are quickly brought from distant points at a trifling cost. Mention several such articles. No one locality is in danger of suffering from want of food because, if the supply fails there, it is easily obtained from other sections.

The effect of steam and electricity on the industries and inhabitants of cities is striking. Persons living scores of miles away often do much of their shopping in the cities. Also, owing to trolley lines, elevated railways, and other means of rapid transit, those engaged in manufacture or commerce are enabled to live many miles distant from their places of work and thus secure more healthful homes in

the suburbs. Because so many people are able to have their homes in the suburbs, the cities are not nearly so overcrowded as they otherwise would be.

Influence of our Surroundings on Education and Government. — When our Union was formed, more than a century ago, many wise persons believed it an almost impossible experiment. Our population was scattered over so many hundred miles along the Atlantic coast (Fig. 35) that people living in one part were apt to know and care little about those in another part far away. It seemed probable that quarrels and wars would arise as a result of differences of opinion, and therefore that our republican government might be dissolved into several governments.

Nevertheless our boundaries have been so enlarged as to include far more territory than was originally thought possible (Fig. 268). Aside from that, more than eighteen million foreigners have settled in our country since 1821, bringing to our shores all the principal races of mankind (see table, Appendix), and many of the leading languages, religions, and political beliefs of the world ; but in spite of all this we have kept in such close touch with one another that our Union has grown stronger and stronger.

Each day, by rail and water, articles are being sent to all parts of the country. In all the states the people read the same news every morning, and whatever books are found especially valuable in one section are quickly made known in others. Thus we not only enjoy far better opportunities for education than formerly, but we learn to *know* one another ; we have the same thoughts, and we feel a mutual sympathy. So far as meeting and understanding one another are concerned, our country is really far smaller than it was a hundred years ago ; we are living together like one very large family.

It has been a difficult task to convert people from so many quarters of the globe to one common product, called *Americans*, who believe heartily in our republican government (p. 33). But the attempt has not been a failure. Many have gone to the farms, where they have helped to supply the raw products ; others have gone to the mining regions ; but great numbers have settled in the cities, where they are chiefly engaged in work connected with manu-

facturing and commerce. Some are densely ignorant; but the great majority steadily improve in condition, adopt the American customs and ideas, and become good citizens.

Relation between Man and Earth. — The success of our experiment has been due not alone to the people, nor to the form of government, though both people and government have aided. The country has been one of splendid opportunities: vast forests have supplied us with lumber in abundance; fertile soils, broad plains, and varied climates have made it possible to raise, not merely *abundant* crops, but many different kinds; arid plains have invited the ranchman; and mountains and plateaus have yielded mineral fuels, iron, copper, gold, silver, and other mineral products in excess of our own needs.

Not merely are there raw products of nearly all kinds that we need, but there are abundant opportunities for changing them into the various manufactured articles which help to supply our wants. Water power and coal for manufacturing are easily accessible over a large part of the country. Our water routes (Fig. 266) and the abundance of excellent harbors furnish natural facilities for the movement of raw materials and manufactured products; and the temperate climate is favorable to the development of an energetic race.

The American people have been equal to the task of making good use of these unexcelled natural resources, and the free government has encouraged them to be independent, and has fortunately placed few unwise restrictions in their way. Thus the development of the nation, as well as of single industries, has been due not alone to *men*, but, in large part also, to their *surroundings*. The relation of man to earth, which it is the province of geography to present, is therefore seen to be very intimate, from whatever standpoint we may consider it.

Part II

GENERAL GEOGRAPHY

I. THE EARTH AS A PLANET: SUMMER AND WINTER

Stars and Planets. — As we look into the heavens at night, thousands of stars meet our gaze, and by the help of powerful telescopes

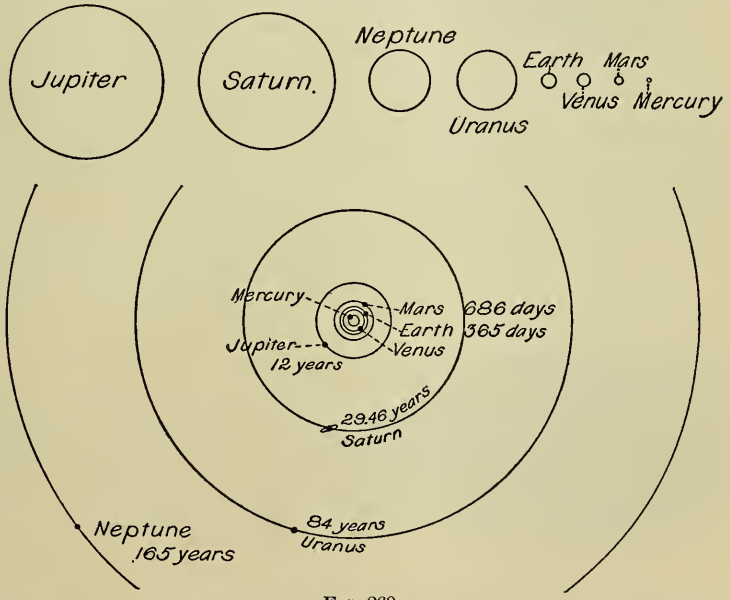


Fig. 269.

The circles at the top show the relative size of the planets; the lower figure shows their relative distances from the sun.

many more thousands have been discovered. The stars are fiery hot bodies like the sun, but so far away that they appear only as twinkling lights.

Some impression of the immensity of the universe is gained when we reflect that some of the stars are so distant that their light, which is now reaching our eyes, may have started toward us as long ago as the time of Christ. Yet light travels so rapidly that it takes less than nine minutes for it to pass over the 93,000,000 miles that separate us from the sun.

Some of the brightest of the heavenly bodies have no light of their own, but, like the moon, merely reflect light that falls upon them from the sun. They do not remain in one part of the heavens, as the true stars do, but slowly change their position. For this reason they were long ago called *planets*, which means wanderers.

The planets are much nearer to us than the myriads of stars ; in fact, they are members of the solar family to which the earth belongs. The sun is the centre of this family, or *solar system*, and supplies the members of it with light and heat. The eight large planets (Fig. 269), named in the order of their distance from the sun, are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune.

The two most distant of the planets cannot be seen without a telescope; but the others are easily seen, and Venus is the most brilliant object in the heavens, after the sun and moon. It appears either as the Evening Star or Morning Star. Find some of the planets in the sky.

There is a very close resemblance among the members of this solar family. All are spherical in form, and each one, whose movements are known, rotates upon an axis while revolving about the sun.

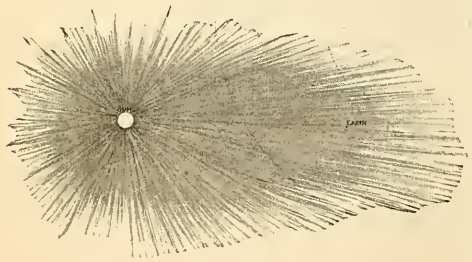


Fig. 270.

Notice that of all the rays passing outward from the sun only a very small part reach the earth, the rest passing off into space and to other planets.

Although the earth is much nearer the sun than some of the other planets, its real distance is about 93,000,000 miles, and through all that space the sun sends both light and heat (Fig. 270). Certainly it takes a tremendous body to do this, and that fact is clearly shown in Fig. 271.

Continents and Ocean Basins. — It is believed that all of the planets were once hot bodies like the sun and the stars. The larger

planets have not cooled as much as the earth, and some of them seem still to be hot. For example, the atmosphere of Jupiter is always full of clouds, as if the heat of the planet caused the ocean water to rise as steam. On the other hand, Mercury, Mars, Venus, and the Earth (Fig. 269), being so much smaller, have of course cooled more quickly. They have therefore become solid, and a cold "crust" of minerals and rocks has formed around the still heated interior.

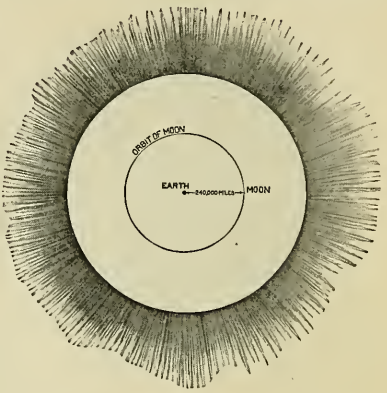


FIG. 271.

Relative size of earth and sun. This shows how very large the sun is. Notice that the distance from the centre of the sun to its outside is much greater than the distance from the earth to the moon, which is about 240,000 miles from us.

You will recall (p. 1) that, as the interior of the earth continues to cool and contract, the crust settles upon it and is thus thrown into folds and wrinkles. It is these great upfolds that have formed North America and the other continents, while the downfolds have formed the ocean basins (Fig. 272). Name the continents and compare North America in area with each of the others (see Appendix). Although there seems to be an enormous quantity of land, only about one-fourth of the earth's surface rises above the water. Observe, too (Fig. 273), that most of this land is found within a single hemisphere.

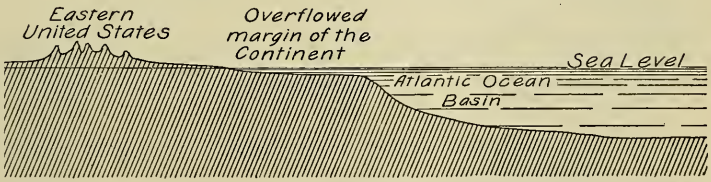


FIG. 272.

To illustrate the fact that the oceans fill the great depressions in the earth's crust that lie between the continent upfolds.

Mountains. — In our study of North America we saw that the mountain ranges were caused by the narrower foldings of the earth's

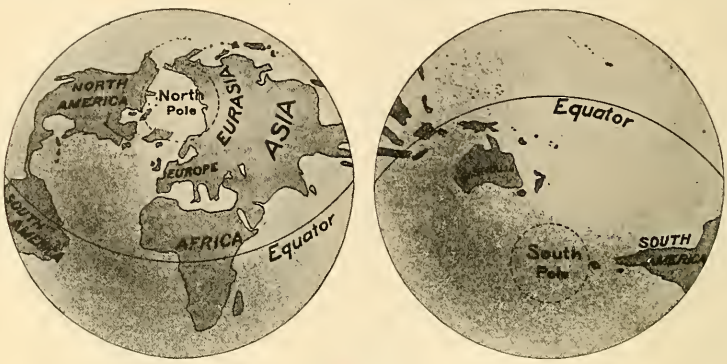


FIG. 273.

The land and water hemispheres.

crust, and that, through the cracks thus formed, melted rock sometimes poured forth in such quantities as to build lofty peaks called

FIG. 274.

The girdle of mountains and volcanoes encircling the Pacific Ocean. Extinct volcanoes shown by circles, others by black dots.

volcanoes (Figs. 6 and 149). Western North America possesses a vast number of mountains, extending its entire length. Name and

locate the principal ranges ; also some of the highest volcanic cones. Figure 274 shows that these mountains are continued southward to Cape Horn, and also along the western side of the Pacific until they form a great girdle almost encircling that ocean. This series of highlands is often called the *World Ridge*. As that portion of it in western North America has been seen to exert a great influence upon the development of our continent as the home of man, so the other parts will be seen to exert a mighty influence upon the other continents.

Daily Motion. — The earth, like the other planets, is rapidly rotating, that is, turning on one of its diameters, called the *axis*. When we glance out of the window of a moving car, the objects we pass appear to be moving in the direction opposite to that in which we are travelling. It seems as though we were standing still. In a similar way the rotation of the earth makes the sun *appear* to rise and set, and for a long time people believed that it was the sun that moved, and not the earth.

In what direction must the earth rotate, since the sun appears to move from east to west? The period of time required for one rotation is called a *day*. Since the circumference of the earth at the equator is about twenty-five thousand miles, how far does a point on the equator move in an hour? In a minute?

By rotating a globe or an apple in the sunlight show how day and night are caused on the earth. Hold the sphere still; what would be true on opposite sides of the earth if it did not rotate at all? What might be the effect upon life on the earth if the same side were always toward the sun?

Yearly Motion. — There are other variations of our light and heat besides those due to the earth's rotation. For instance, if we could spend a summer with the Eskimos in Greenland, we should find weeks of constant day,[1] and be able to see at midnight as well as at midday. Late in the summer, the sun begins to set, and finally it fails to appear even at noon. Then it becomes bitterly cold (Fig. 275).

[1] Exactly at the north pole there are six months of day and six months of night.

During the winter night the stars and moon furnish a dim light, by the aid of which the Eskimos are able to hunt the seal and polar bear which supply them with food (pp. 26 and 207).

FIG. 275.

Some of the Eskimos whose homes are in the frigid north. The mothers carry the babies in fur hoods on their backs.

On the other hand, in Central America the sun reappears every morning in the year; and every noon it is almost directly overhead, while for a part of the year it is exactly overhead. No snow and ice are seen, and the climate is so warm, even during the winter, that the inhabitants wear as few clothes as possible. Indeed, some savages in such hot countries wear almost none (Fig. 276).

Even where each of us lives the period of daylight and the temperature are changing from week to week. Describe these changes as you yourself have observed them.

These different positions of the sun, with the resulting changes in the length of the days and in the seasons, are among the most important facts about our home, for they compel great changes in our food, clothing, and habits. Two causes work together to produce them, as we shall now see.

Inclination of the Earth's Axis. — One cause is found in the position that the earth's axis holds with reference to the sun. It is easy to see that if the earth always

FIG 276.

Savages whose homes are in the tropical zone. Contrast their dress with that of the Eskimos (Fig. 275).

stood before the sun in one position, as on September 23 or March 21 (Fig. 277), the sun's rays would reach from pole to pole, lighting one half of the globe at a time and leaving the other half in darkness. As the earth made its daily rotation, all places upon it would have day and night every twenty-four hours, excepting at the very poles, where the sun would *always* be seen on the horizon.

But if the earth's axis were tipped or *inclined*, so that the north pole was always turned *toward* the sun, as on June 21 (Fig. 277, also Fig. 287), the conditions would be very different. Then, as the earth rotated, the sun's rays would not only reach the north pole, but extend beyond it, while they would not reach the south pole at all.

In that case, if one stayed a year in the north frigid zone, the sun would be in sight all the time, while if he stayed a year at the south pole he would not see it at any time. Since the sun furnishes heat as well as light, it would always be summer in the northern hemisphere and winter in the southern.

If the earth's axis were tipped so that the south instead of the north pole were the one always turned toward the sun, as on December 21 (Fig. 277), the opposite condition would prevail in each hemisphere. That is, it would be perpetual night at the north pole and constant winter where we live; but perpetual summer would prevail in the south temperate zone, and the south pole would have constant sunlight.

The fact is, that *the earth's axis is always inclined*, and in one direction; but, as we well know, our summer does *not* last all the time, nor do we have perpetual winter. We also know that both the north and south poles are in darkness a part of the year, and lighted for the remainder of the year.

Revolution of the Earth around the Sun. — This leads us to the second cause for our seasons. Although the earth's axis is *always* inclined in the same direction, the earth does *not* always remain on the same side of the sun; for, in addition to its rotation, the earth has another movement, that of travelling, or *revolving*, around the sun (Fig. 277). On this account it does not have the same pole always turned toward the sunlight.

Although the sun is ninety-three million miles from us, the earth is moving at such a tremendous rate that it completes one journey

around the sun, or one *revolution*, in almost exactly 365 days, or one year. This explains how we get our year.

The other planets require different periods for one revolution. For instance, Mercury, which is about 36,000,000 miles from the sun, takes less than three months, while Neptune (Fig. 269), about 2,700,000,000 miles distant, requires 165 years for a single revolution.

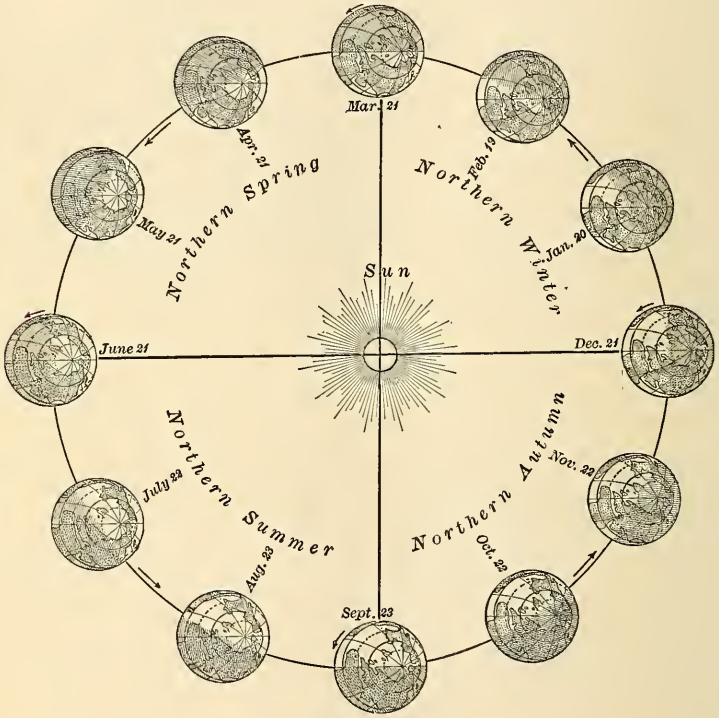


Fig. 277.

To illustrate the revolution of the earth around the sun. The shaded portion represents night. The end of the axis around which the earth rotates is the point where the lines come together (the north pole). At what date is this pole turned toward the sun? Away from it? Neither towards nor away from it? What portions of the earth do the sun's rays reach at each of these times?

The Attraction of Gravitation. — In its revolution the earth is moving at the rate of more than one and a half million miles per day. What speed! And at the same time it is whirling or rotating rapidly on its axis, as already explained (see First Book, p. 116).

As in the case of the earth's rotation, one might ask (First Book, p. 115), Why are we not swept from the earth by the wind? The answer, as before, is that the air, and everything else upon the earth, is drawn toward it and held in place by the force of gravity, so that all travel together in the journey around the sun.

If the earth is revolving at such a fearful speed, why does not the earth itself fly away into space? As a stone swinging round at the end of a string flies off when the string breaks, so it might seem that the

FIG. 278.

Notice that the axis here is inclined in the same direction in each case, but that the light reaches different places on the apple in each of the three positions.

earth would fly away, since there *appears* to be nothing holding it to the sun.

But there *is* something to hold it. It is not a string nor a rope, to be sure, but something far stronger. The sun is very much larger than the earth, in fact, over a million times as large, and attracts the earth to it, as the force of gravity attracts men and houses to the earth. This *attraction of gravitation*, which the sun exerts upon the earth, is what prevents the latter from flying far off into space; it holds the earth as firmly as the string holds the stone.

Inclination and Revolution together. — Since the earth's axis is always inclined in one position, the revolution causes first one pole to be turned toward the sun, and then the other. You can under-

stand how this must be if you run a needle or slender stick through an apple, as in Figure 278, and carry it around a lamp which represents the sun. In doing this be sure always to keep the stick, which represents the earth's axis, tilted in the same direction. As you go, the part of the apple turned *toward* the lamp constantly changes. The inclination of the axis does *not* change; but, nevertheless, first one end, or pole of the stick, faces the light, then the other.

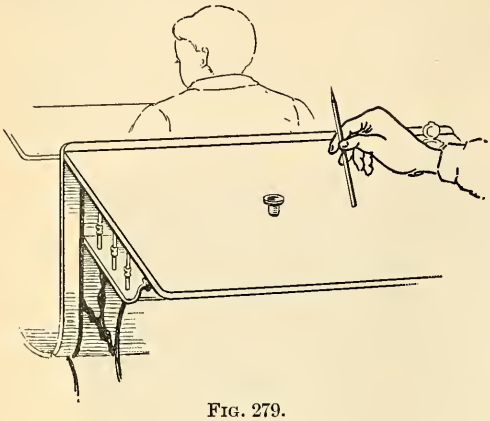


Fig. 279.

So it is with the earth; as it revolves around the sun, always with its axis inclined in the same way (Fig. 277), it is constantly reaching new places in its path of revolution, now with the northern hemisphere facing the sun (June, Fig. 277), and the southern hemisphere turned away from it, then, later, with the conditions just reversed.

This same matter may, perhaps, be better understood by the help of a different illustration.

Place an ink bottle upon your desk. Then rest the blunt end of your pencil upon the table a few inches to the right of the bottle, with the pointed end inclined from you (Fig. 279). Notice that neither end of the pencil is now inclined toward or away from the bottle.

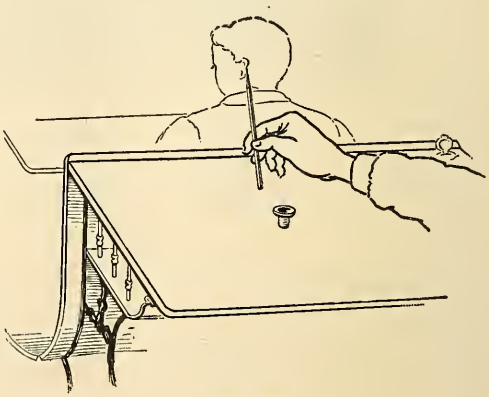


Fig. 280.

Now, keeping the pointed end inclined from you, always in the same direction, slowly move the pencil away from you in a circle around the bottle. When the side farthest from you is reached, the blunt end of the pencil is toward the bottle, while the point is turned away (Fig. 280). On reaching the left side, the two ends are again so placed that neither is turned from the bottle (Fig. 281); but on arriving at the side nearest to you, the pencil point is inclined toward the bottle, while the blunt end is turned away (Fig. 282).

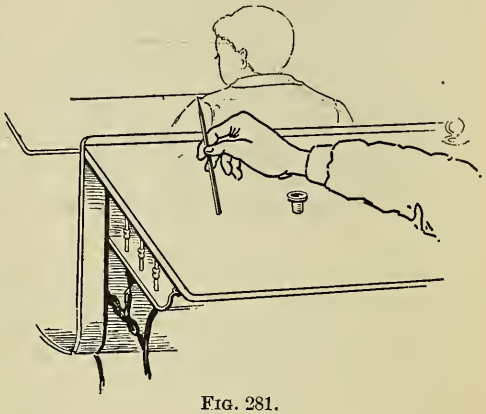


FIG. 281.

These positions of the pencil well illustrate those of the earth's axis with relation to the sun. The bottle represents the sun; the circular path followed by the pencil represents the *earth's orbit*, as the slightly elliptical path taken by the earth in its journey about the sun is called; and the pencil stands for the earth's axis. The pencil, instead of being perpendicular to the surface of the desk, was somewhat inclined; and the earth's axis is also inclined to the plane through which the earth revolves, or *the plane of the orbit* (Fig. 283). The axis of the earth remains in this one position, pointing always toward the north star, though not directly at it. Look for the north star some clear starlight night.

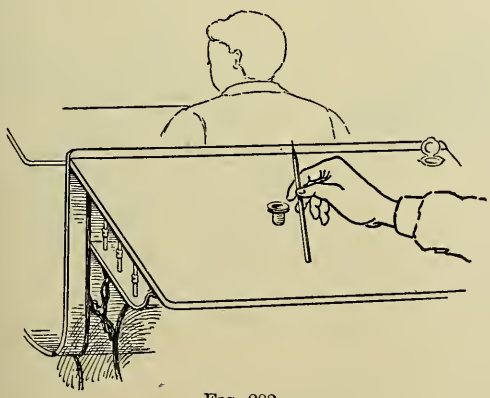


FIG. 282.

Results of the Earth's Revolution and Inclination of its Axis. — This fact of the unchanging inclination of its axis, as the earth revolves about the sun, may seem a small thing in itself; but it is really of such momentous importance that hundreds of our customs

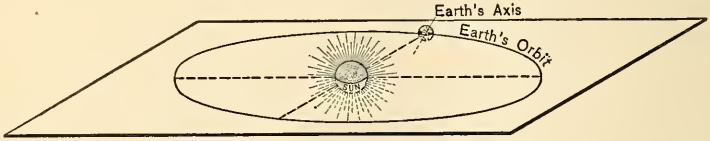


FIG. 283.

To illustrate the inclination of the earth's axis to the plane of its orbit.

are regulated by it. It determines the time when lamps shall be lighted, when grain shall be planted and harvested, and when the navigation of rivers and lakes shall open and close in cold climates. It also greatly influences the kind of clothing that we wear and the sports that we enjoy. Name some other of its influences. It does all this by continually changing the length of our day and the inclination at which the sun's rays reach the earth's surface.

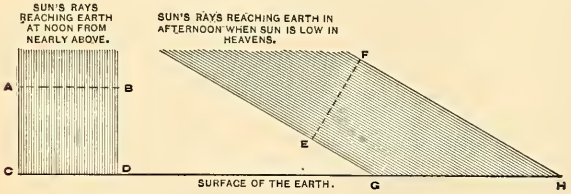


FIG. 284.

Two bundles of rays, each a half inch wide (A–B and E–F); but since one set comes from nearly overhead, while the other set comes at a slant, the first fall upon a smaller surface than the second. If you measure C–D, you will find it half as long as G–H. That is, the same number of rays coming at a slant cover twice as much ground as those from above.

One reason why the varying inclination of the sun's rays can have such a powerful influence is indicated in Fig. 284.

Morning and evening are cooler than midday chiefly because at the former time the sun's rays fall at a greater slant (Fig. 284); and for the same reason winter is colder than summer. Therefore at the equator, or in southern North America, where the sun is either directly overhead or nearly so (Fig. 287), it must always be very warm; while, near the poles where the sun's rays must strike the earth at a great slant, it is always cold.

One reason why slanting rays are not so warm as vertical rays is that there is a great deal of dust floating about in the air, as may easily

be seen when a beam of sunlight enters a dark room. This interferes with the passage of the rays, much as muddy water does; hence, when the sun is low and its rays pass through a great thickness of dusty air (Fig. 286), many of them are prevented from reaching the earth. In large cities where there is much smoke, and on hazy days when there is much dust in the air, the sunlight is greatly interfered with.

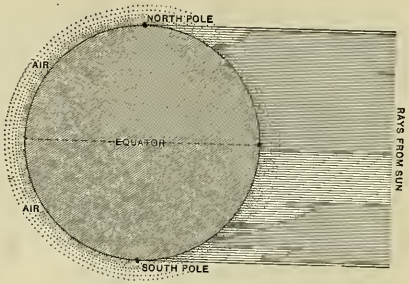


FIG. 285.

A diagram showing that the sun's rays near the poles reach the earth in a more slanting way, and after passing through more air, than at the equator.

Length of Day and Night; the Seasons. — Now we are in a position to understand Figure 277 more fully. The position of the earth on September 23 corresponds to the first position of the pencil (Fig. 279). Although the axis is inclined, neither pole is turned from the sun, and the light therefore extends from pole to pole. Then the sun's rays are vertical at the equator, and the days and nights are equal over all the earth. This time is called the *autumnal equinox* (the latter from two words meaning *equal* and *night*).

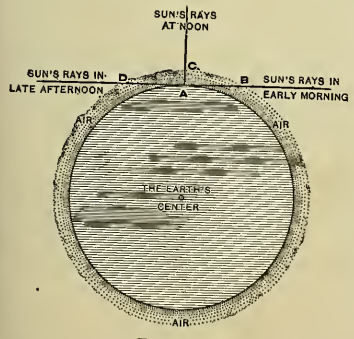


FIG. 286.

To show that the sun's rays pass through more air when the sun is low in the heavens than when it is high. Explain the figure.

The position of the earth on December 21 corresponds to the second position of the pencil. Then the sun's rays are vertical at the *Tropic of Capricorn*, and they reach far beyond the south pole, lighting and warming all the south frigid zone throughout the entire twenty-four hours. But the north frigid zone is left in darkness. At that date, which is the beginning of winter with us and of summer in the southern hemisphere, the sun appears farthest south, and we have our shortest day. This is also the day when the sun's rays reach us at the greatest slant. Examine a

globe to see what countries are crossed by the Tropic of Capricorn. Here the sun seems to turn and move northward, and for that reason this parallel is called a *tropic* (meaning to *turn*).

The position of the earth on March 21 corresponds to the third position of the pencil, when the poles are again turned neither toward nor away from the sun. The equator is once more under the vertical rays of the sun, and the days and nights are equal the world over. This period, called the *vernal equinox*, is the commencement of our spring. After this date our days gradually lengthen until, on June 21, the continued revolution of the earth has brought it into the fourth position represented by the pencil (Fig. 282). The sun's rays are then vertical over the *Tropic of Cancer* (Fig. 287), and at this date our summer begins. At noon of the 21st of June the sun is directly over the heads of the people who live in Cuba and southern Mexico.

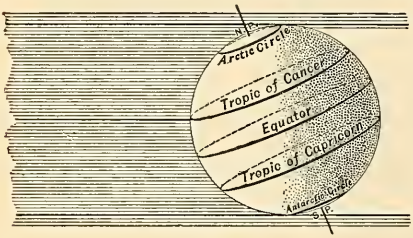


FIG. 287.

Position of the earth June 21. Notice the vertical ray (middle heavy line) over the Tropic of Cancer. The shaded portion of the ball represents night.

At that timet here is sunlight throughout the entire twenty-four hours in all the region enclosed by the *Arctic Circle*.

The 21st of June, when the midnight sun shines on all parts of the north frigid zone, is our longest day; but farther south the days grow shorter until the *Antarctic Circle* is reached. There, on June 21, the sun just appears on the horizon at noon, while nearer the south pole it is dark throughout the entire twenty-four hours.

After the 21st of June, the earth's further revolution causes the north pole to begin to turn away from the sun and the south pole to turn toward it. The sun then *appears* to be moving southward, until, on the 23d of September, its rays are once more vertical over the equator, and a year has been completed. Every twelve months the earth makes this revolution, producing our seasons and constantly changing the length of our days and nights.

We see that these important changes are due to the inclination of the earth's axis and to the revolution of the earth around the sun. Can you think what would be the result if the axis were inclined considerably more? Carry an apple around the lamp in this different position to see. What changes would then have to follow in our mode of living? What if the axis were inclined less? What if it required more than 365 days for the earth to revolve around the sun? What if considerably less?

FIG. 288.
The sun at midnight of June 21, at North Cape, Norway.

Boundaries of the Zones. — The exact *amount* of inclination of the earth's axis has not been stated, but that is a matter of very great importance, as you have just seen.

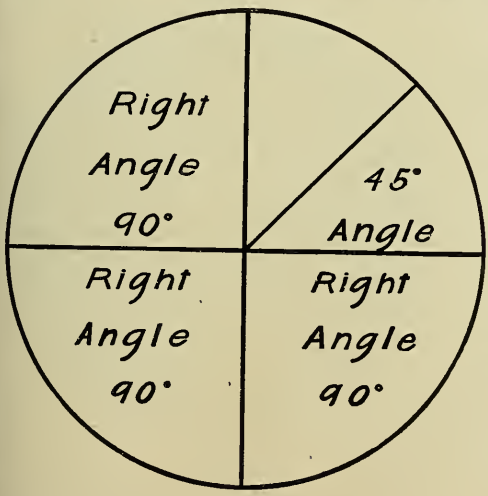


FIG. 289.
To illustrate the meaning of angles.

In considering the amount, it is necessary to speak of angles. Angles may be measured by the use of circles. In your study of Latitude and Longitude (p. 40) you learned that a great circle of longitude is divided into 360 equal parts, called degrees (marked °), and that the distance from the equator to one of the poles is one-fourth of this circle, or 90°.

So any circle may be divided into 360°, and any angle that includes one-fourth of the circumference between its sides is called a right angle. Point out the right angles in Figure 289. An angle that is one-half as large as a right angle contains 45°. By drawing lines from the centre of a circle to its circumference, construct an angle of 90°; and others of 120°, 45°, and $22\frac{1}{2}$°.

The angle in Figure 290 is $23\frac{1}{2}°$, and shows just how far the pencil (Figs. 279–282) should be inclined. Hold your pencil perpendicular to the top of the table ; now tilt it about $23\frac{1}{2}°$. That is the position of the earth's axis with reference to the plane of its orbit, and year after year it remains at that angle.

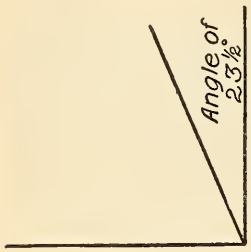


Fig. 290.
An angle of $23\frac{1}{2}°$ drawn in a right angle.

This is the reason why the tropics and polar circles are situated just where they are. On June 21, when the north pole is turned toward the sun, the vertical rays fall $23\frac{1}{2}°$ north of the equator, because the axis is inclined that amount. On that account the Tropic of Cancer lies $23\frac{1}{2}°$ north of the equator. At this date, also, the sunlight reaches the same number of degrees beyond the north pole, and therefore the Arctic Circle is located $23\frac{1}{2}°$ from the pole.

On December 21 the earth's revolution has caused the north pole to turn away from the sun, and the vertical rays then fall $23\frac{1}{2}°$ south of the equator, while the sunlight reaches the same distance beyond the south pole. Thus the Tropic of Capricorn and the Antarctic Circle are located. It is plain, therefore, that the inclination of the earth's axis determines the exact boundaries of the zones.

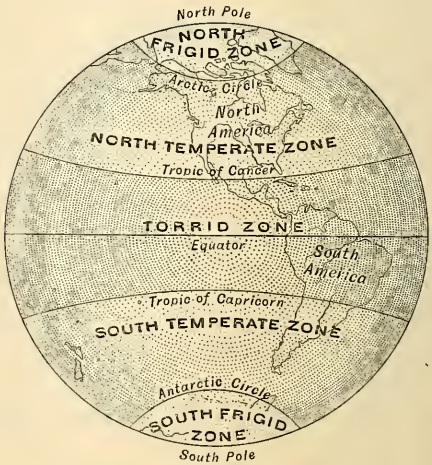


Fig. 291.
A map of the zones. Make a drawing similar to this.

Review Questions. — (1) What is a star? (2) Give some idea of the distance of the stars from us. (3) What is a planet? (4) Name the eight planets. (5) Mention some points of similarity among them. (6) What is the distance of the earth from the sun? (7) Give some idea of the size of the earth compared with that of the sun. (8) How has the earth's crust been formed, with its continents and ocean basins? (9) What is the extent and position of the land surface?

(10) Tell about the girdle of mountains and volcanoes which encircles the Pacific. (11) What is the earth's axis? (12) What was formerly believed about the earth's movement? (13) In what direction does the earth rotate? (14) Tell about variations of light and heat, (*a*) among the Eskimos, (*b*) in Central America, (*c*) at your home. (15) What would be the effect if the earth's axis were never inclined? (16) If the north pole were always turned toward the sun? (17) If the south pole were always turned toward it? (18) What is the real position of the earth's axis? (19) What other motion besides rotation has the earth? (20) What determines the length of our year? (21) Why do we not notice the rapid movement of the earth? (22) What prevents the earth from flying off into space? (23) Show how the revolution of the earth causes first one pole, then the other, to be turned toward the sun. (24) Illustrate the same thing with a pencil. (25) What is the earth's orbit? (26) What is the plane of the earth's orbit? (27) How are we affected by these positions of the earth? (28) Why are the sun's rays less intense when the sun is low in the heavens than when it is higher? (29) Show how this fact makes it colder at the poles than at the equator; also, in the morning than at noon. (30) Describe the position of the earth, the length of day, etc., on September 23. (31) On December 21. (32) March 21. (33) June 21. (34) How may angles be measured? (35) How much is the axis of the earth inclined? (36) What determines the boundaries of the zones?

Suggestions. — (1) Find the north star. (2) Write out the observations you have made about the moon. (3) What changes might result if there were less water in the ocean depressions? (Think of effects on size of continents; on climate; and on land adapted to agriculture.) (4) State some of the changes that would result if there were enough water to raise the level of the sea a thousand feet. (5) Show by a globe, or a ball, how the two movements of the earth, rotation and revolution, can be going on at the same time. (6) How long is your day at present? Are the days growing longer or shorter? (7) During which months do they grow longer? (8) During which months shorter? (9) Find out why the earth is slightly flattened at the poles. (10) What might be some of the effects if each rotation of the earth lasted longer than twenty-four hours? (11) If much less? (12) At what time of day does your shadow always point directly north? (13) Notice how your shadow changes with the season in early morning; at noon; in the evening. (14) Tell about the direction and length of a man's shadow at noon on December 21 at various points between the poles. (15) On June 21. (16) On September 23. (17) How long is our longest night? Our shortest? (18) Which zone experiences the slightest change of seasons? Why? (19) What advantages and disadvantages do you see in that fact for people living there? (20) Is it once or twice each year that the vertical rays of the sun fall upon any one place in the Torrid Zone? (21) Write a story telling about some changes that you have noticed, in plants and animals, which have been caused by the change in season.

II. WINDS AND RAIN

Winds

Review. — Our previous study of geography has shown that very regular winds blow over a considerable part of North America. For example, the West Indies, Central America, and Southern Mexico receive their winds generally from the *northeast*, while on

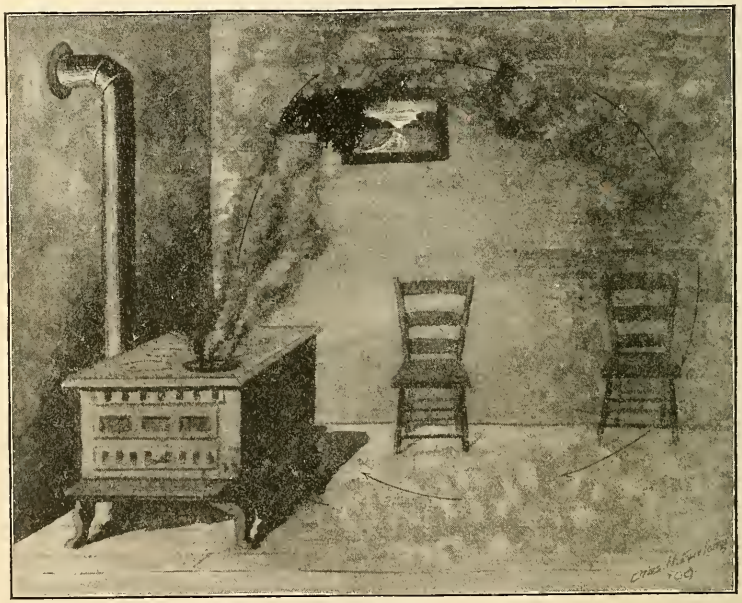


Fig. 292.

To illustrate how the air moves in a room heated by a stove.

the western side of the continent, all the way from San Francisco to Alaska, they blow quite regularly from a *westerly quarter*. On the other hand, in the eastern part of the United States, the winds are irregular in direction, although prevailing from the west. Let us examine into the causes of these movements of the atmosphere.

Effect of a Stove. — As a beginning of the inquiry, we will consider the currents of air produced by a hot stove in a room (Fig. 292). As the air near the stove is warmed, it expands and grows lighter. Then the cooler air settles down and flows in, forcing upward that which has been warmed. The latter grows cooler in contact with the cool ceiling and walls of the room; and, being made denser and heavier on that account, it again settles toward the floor and then once more moves toward the stove. In such a room you can easily observe how much warmer the air is near the ceiling, where it has risen from the stove, than near the floor at some distance from the stove.

Winds of the Earth. — The greater winds of the earth may be compared to this movement of air in a room, the torrid zone, warmed by the sun's rays, taking the place of the stove. There, owing to the torrid heat, the atmosphere becomes expanded and light. The heavier air to the north and south flows in, pushing the light air away and producing winds, known as the *trade winds* (Fig. 293), which begin in the temperate zones, hundreds of miles away.

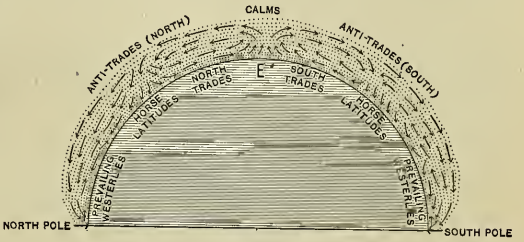


FIG. 293.

Diagram to show, by arrows, the movement of the greater winds of the earth.

Since the heated air must escape somewhere, it rises far above the surface, and then moves back in the same direction from which it came, forming the return trades or *anti-trade winds* (Fig. 293). The atmosphere extends many miles above the earth, so that there is plenty of room for two winds blowing in opposite directions, one above the other.

In Cuba, the Caribbean Sea, and elsewhere, where the trade winds at the surface are blowing toward the southwest, one notices that the clouds far up in the sky are steadily borne in the opposite direction by the anti-trades. Also, when volcanoes in Central America have been in eruption, the ashes that were blown out from them have been carried

hundreds of miles in a direction opposite to that of the prevailing trade winds at the surface.

Being cooled on account of its great height, the air of the anti-trades slowly settles, some of it coming to the surface at about a third of the distance to the poles. There it spreads out, a part continuing on toward the poles, a part returning to the equator as the trade winds (Fig. 293).

As you see, the correspondence between these currents in the atmosphere and those in the room is quite close. In both cases air moves in toward a heated place, then up, then outward and down, and once more inward toward the heated part. Make a drawing to illustrate these *four* directions of movement of the air.

Effect of Rotation. — There are differences, however, and one of them is especially important. In the case of the room, the currents move *directly* toward the stove; then, after rising, directly away from it. If the earth stood perfectly still, the trade winds would doubtless blow directly toward the equator from the north and south and the others directly away from it.

The daily rotation of the earth, from west to east, greatly interferes with that movement. Because of rotation, the trade winds are turned, or *deflected*, from their straight course toward the equator. Those in the northern hemisphere are turned to the right, so that they come from the *northeast;* and those in the southern hemisphere are turned toward the left, and therefore come from the *southeast.*

The direction of the anti-trades is also changed toward the right in the northern hemisphere, where they blow from the southwest, and toward the left in the southern hemisphere, where they blow from the northwest. Thus the anti-trades blow over the same route as the trade winds, but in the opposite direction. We can only state the facts here, for the explanation is far too difficult to give.

Wind Belts. — Now we see why the West Indies, Central America, and Southern Mexico receive such regular winds from the northeast, for they lie in the range of the trade winds just described. The prevailing west winds of the Pacific coast are a part of the air of the anti-trades that has settled to the surface and is moving on in a great whirl around the poles. It is known as the belt of *prevailing westerlies* because the air moves so steadily from a westerly quarter.

If you watch the higher clouds you will find, in most parts of the United States, that they are moving from the west toward the east; and the winds at the surface are also more often from the west than from any other quarter. This section, including northern United States and Canada, in which the prevailing winds are so nearly from the west, is known as the region of *prevailing westerlies.*

What has been said about the winds of North America applies, with some exceptions, to other parts of the world; in other words, there are several belts of regular winds extending around the earth. Figure 296 shows these quite clearly. Point out the belt of *trade winds* north of the equator. Point out the *prevailing westerlies.* Point out the two corresponding belts of wind on the south side of the equator. Notice how much more definitely these are all shown over the ocean than over the land.

Winds are much more steady on the ocean than on the land for several reasons, the principal one being that the temperature of the water does not change so quickly as that of the land. On land one place may become much warmer than another not far away, and then winds blow toward the warmer section. This often changes the direction of the regular winds.

So steady are the prevailing westerlies over the ocean, that, in the southern hemisphere, where there is little land, they almost always blow from the west. Indeed, it is said that vessels, choosing a course south of Africa and South America, can sail around the world with fair winds almost all the way, if they go *toward* the east; but if they sail in the opposite direction, the winds are against them.

All these belts of wind owe their existence to the differing temperatures of the several zones; and since the sun, which is the cause of these zones, has shone for millions of years, and will probably continue to shine for millions more, we may be certain that these great winds are *permanent winds.* The currents of air in a room cease when the stove grows cold; but, for ages to come, the sun will heat the torrid zone more than the temperate. Thus the trade winds will be kept in motion day and night, winter and summer, as they now are, and as they were when they helped Columbus on his venturesome voyage across the Atlantic.

Belt of Calms and Belts of Horse Latitudes. — Besides the four belts of winds just mentioned there are three belts of calms and light, variable winds. As the trade winds approach the central line of the heated belt, or the *heat equator*, they travel more slowly. Then, owing to expansion from heat, and to pressure from the colder air behind, the air rises over a broad area to a great height. In this belt of rising air, whatever winds are felt are light and changeable, and calms often prevail; hence the name *belt of calms*, as shown in figures 293 and 296. The width of this belt is several hundred miles.

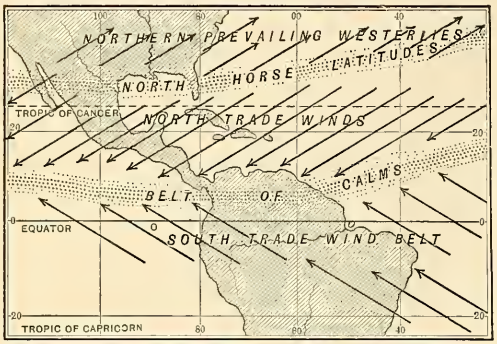


Fig. 294.

Diagram to show the position of the trade wind belts and the belt of calms in summer. Compare with Figure 295.

Northern Mexico and Southern California are situated in another belt of light winds with frequent calms. Here, however, as stated before (p. 262), the air of the anti-trades is *settling* toward the earth, a part to return as trade winds to the belt of calms, and a part to continue onward as the prevailing westerlies. This is known as the region of the *horse latitudes*.[1] Point out the

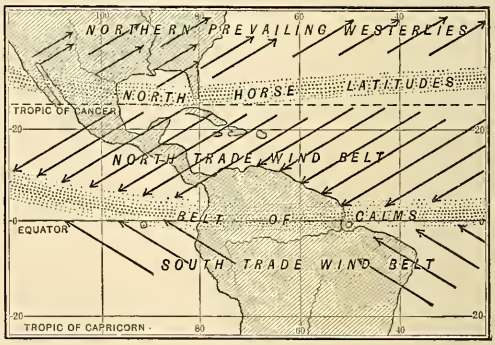


Fig. 295.

Diagram to show the position of the belt of calms and the trade winds in winter. Compare with Figure 294.

[1] Called horse latitudes because sailing vessels, carrying horses from New England to the West Indies in the early days, were so delayed by the calms that the horses had to be thrown overboard when the drinking water gave out.

FIG. 296.

A diagram to show the principal wind belts of the earth.

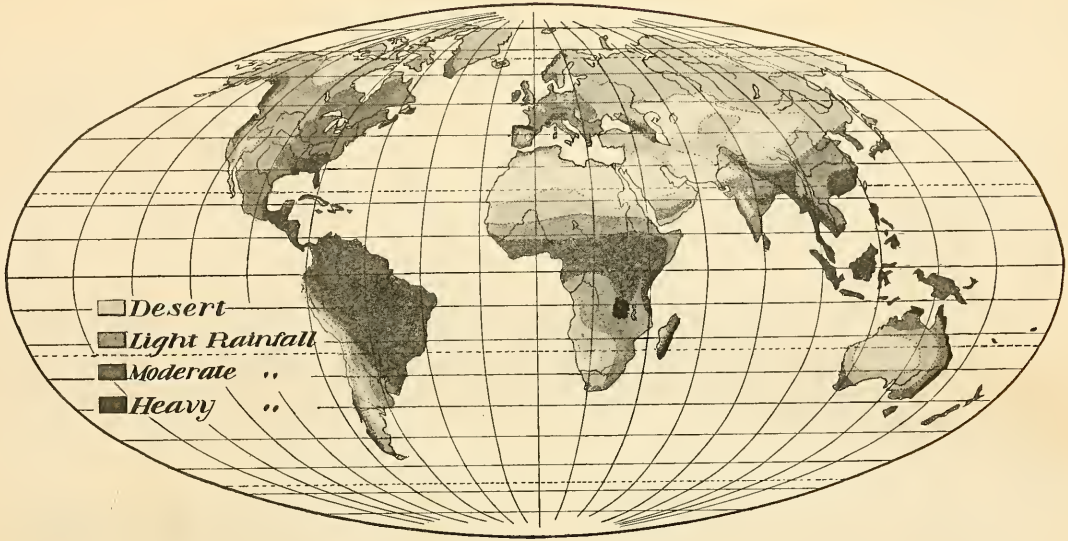


FIG. 297.

A rainfall map of the world. In which of the wind belts (see Fig. 296) do we find the heaviest rainfall? On which coasts? Where are the deserts? Explain the location of those on each continent. Why should there be more desert in Africa than in South America?

belt on figures 293 and 296. Show the corresponding belt on the south side of the equator.

Effect of Revolution. — The belt of most intense heat is not always in exactly the same part of the earth, being north of the equator in June, when the sun is vertical at the Tropic of Cancer, and south of it in December, when the sun's rays are vertical at the Tropic of Capricorn. This causes all these belts to change their position somewhat, being farther north in our summer than in our winter (Figs. 294 and 295). The effects of this fact are very important, as we shall see (p. 267).

Rain

Causes for Rain. — Knowing the wind belts that encircle the earth, we have a key to the principal rain belts; for winds are the water carriers of the earth. Water which is evaporated from the surface of the oceans and lands, is borne along in the air. As rain or snow it descends to the earth, abundantly along most coasts, and, usually, less liberally toward the interior of the continents.

It is an important fact that there can be more water vapor in warm than in cool air. Therefore, whenever air is cooled sufficiently some of the water vapor which it bears is condensed. For example, vapor condenses on an ice-water pitcher because the air next it is cooled; and dew forms on grass when the air near the ground grows cool in the evening. In a like manner the vapor in our breath forms a little cloud when the breath in winter is cooled by mixture with the cold outside air.

Rain is usually caused by the cooling of air which is rising to higher levels and therefore expanding. When you open the valve of a bicycle tire, the outrushing air expands and grows cool; and if you place your finger over the valve, you can feel the coolness. In a similar way, when air rises above the surface of the earth it expands because there is less air above to press upon it. Then it grows cool; and while doing so, some of its vapor may be condensed to form clouds and raindrops. So whenever air from the damp oceans is rising over highlands, or whenever it is being raised over warm lands by the cooler air that pushes underneath, as in the belt of calms, rainfall naturally results. Briefly, — *when air rises, it expands and cools; and then rain commonly follows.*

On the other hand, air that is settling grows warmer, and instead of giving up its vapor, it becomes dry and clear. This may again be illustrated by reference to the bicycle; for when air is pumped into the tire, the pump becomes warm as the air is compressed. In a like manner, air that is descending toward the earth's surface is compressed and warmed because of the increasing pressure of the atmosphere above. Since there can be more vapor in warm than in cool air, when air flows down the mountain slopes, or descends from high altitudes, as in the horse latitudes, clouds disappear and water is evaporated from the ground. Briefly, — *when air descends, it becomes denser and grows warmer; then the sky is clear and the weather dry.*

Rain Belts in North America. — These facts have been well illustrated in the rains of North America. The northeast trade winds, having gathered a large amount of vapor from the Atlantic Ocean, the Carribbean Sea, and Gulf of Mexico, deposit it on the windward slopes of the West Indies, Southern Mexico, and Central America (Fig. 298). The southwestern slopes of these islands, however, receive a smaller quantity, and the western coast of Mexico is therefore arid. The prevailing westerlies, having travelled a long distance over the Pacific, likewise cause heavy rains along the western coast of North America (Fig. 299). But the land further east grows more arid, because these winds also lose their moisture in passing over the land. Northern Mexico and southwestern United States, lying within the horse latitudes, where the air is descending, receive very little rain and are arid (Fig. 299).

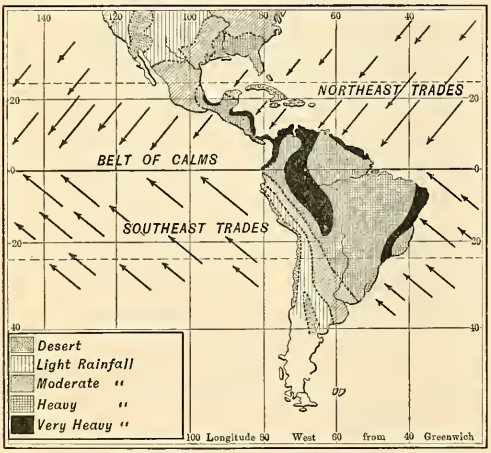


FIG. 298.

The rainy east coasts and arid west coasts of the trade-wind belts. Also the rainy belt of calms of South America.

Other Rainy and Arid Regions of Northern Hemisphere. — Other regions lying within these belts illustrate the same principles. For example, note (Fig. 298) what heavy rains are brought to northern South America by the northeast trade winds. The Hawaiian Islands, also lying within their range, are kept moist by them, especially on the windward side of the highlands, just as in the West Indies.

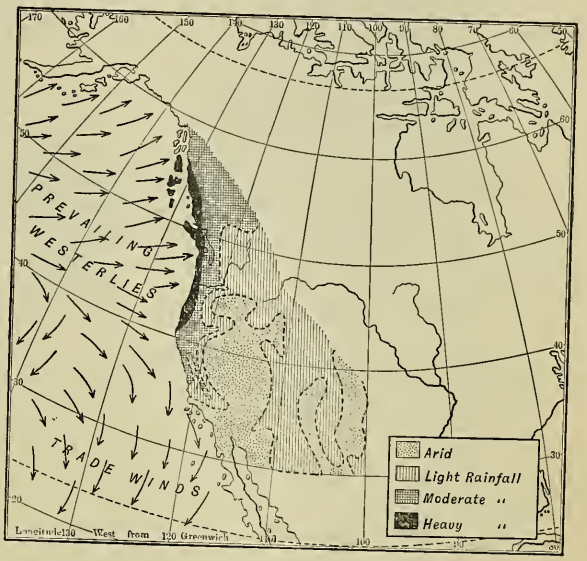


FIG. 299.

The heavy rainfall where the prevailing westerlies blow over the rising coast. What is the condition farther east? What is the case where the trade winds blow? Why?

But the northeast trade winds of the Old World deposit little moisture, as is clearly shown by Figures 297 and 300. One reason is that they blow largely over land, rather than over water; it is mostly level land, too. Another very important reason is that the air is moving from a cooler to a warmer region and is therefore not forced to give up its moisture. On the contrary, it can take more vapor and is steadily evaporating water. Thus the trade winds are drying winds on the land, and this accounts for the desert of Sahara and, in fact, for most of the other desert regions of the world. Europe is affected by the *prevailing westerlies* much as western North America is. But its three southern peninsulas, like southern California, lie partly within the horse latitudes, and their southern portions are much affected by drought.

South of the Equator. — South of the equator we find the southeast trade winds causing heavy rains on the east coast of South

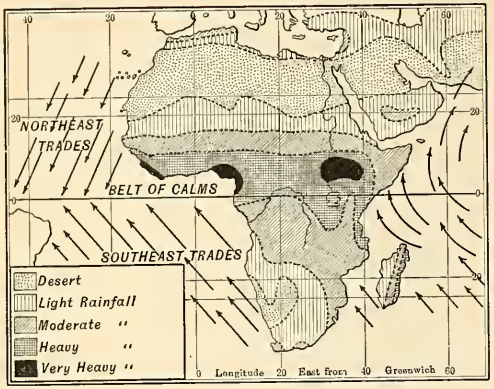


FIG. 300.

To illustrate the desert regions in the trade wind and horse latitude belts of Africa. Also to show the heavy rainfall in the belt of calms. Find the similar belts on Figures 298, 299, and 301.

America (Fig. 298); then proceedinga cross the continent, they cause other heavy rains in the neighborhood of the Andes; but parts of Peru and Chile on the western side of the mountains are left to suffer from drought although within sight of the greatest ocean in the world. Australia, lying in the same belt of winds, is similar. But this time the loftiest highlands are close to the east coast, so that nearly all the remainder of the country suffers for want of rain (Fig. 301).

Belt of Calms. — The belt of calms is the most rainy of all the belts (Figs. 298, 300, and 301), because its hot, moisture-laden air is rising and cooling. After a clear night in that region, the sun usually rises in a cloudless sky. As the morning advances and the heat grows more intense, the damp air rises more rapidly; then small clouds appear and grow steadily until rain falls from them. Showers occur practically every day, increasing in the afternoon. When the sun sets and the air rises

FIG. 301.

Showing the heavy rainfall on the east-facing coast of Australia where the trade winds blow. Notice also the arid interior and west coast. What is the condition in the belt of calms? What resemblance do you see to Figure 299?

less actively, the clouds melt away, the stars appear, and the night is as clear as before. Our hot, muggy summer days, with heavy

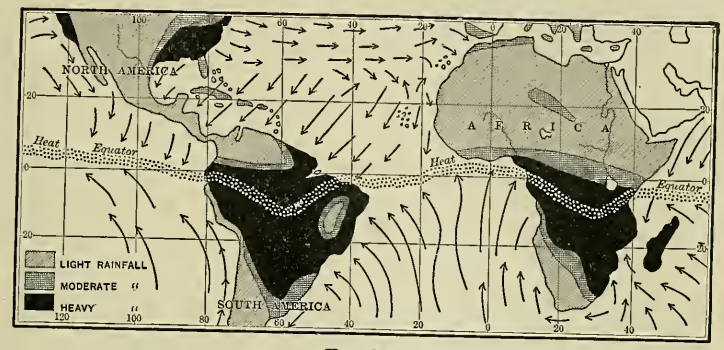


FIG. 302.

Winds and rainfall in South America and Africa from December to February.

thunder showers in the afternoon and evening, illustrate the weather that is repeated day after day in this belt of calms.

It is the heavy rain there that supplies the dampness necessary for the dense jungles of the tropical forest of the Amazon valley, Central Africa, and the East Indies (Fig. 297).

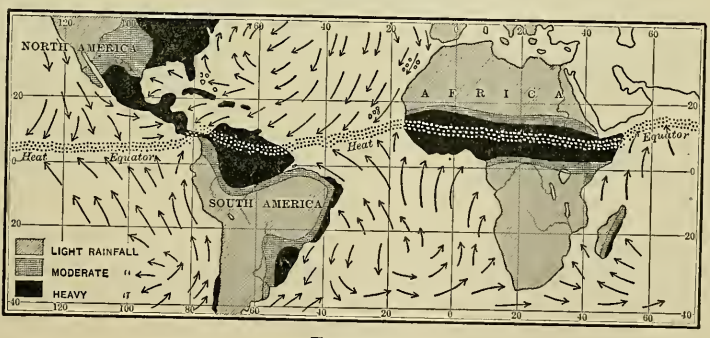


FIG. 303.

Winds and rainfall in South America and Africa from June to August. Compare with Figure 302 to see how the belts of heavy rain have migrated as the wind belts have shifted with the change of season.

Migration of Rain Belts. — The statement has been already made (p. 263) that the wind belts shift northward in summer and south-

ward in winter. One of the most important effects of this change is upon the rainfall. In the torrid zone, for example, many places are within the belt of calms during the summer of their hemisphere, and are swept by the drying trades in their cooler months, thus dividing the year into wet and dry seasons. The part of northern Africa lying between the Sahara and the Sudan affords an instance of this (Figs. 302 and 303).

Eastern United States and Canada. — Thus far only the regular wind and rain belts have been considered, and no explanation has

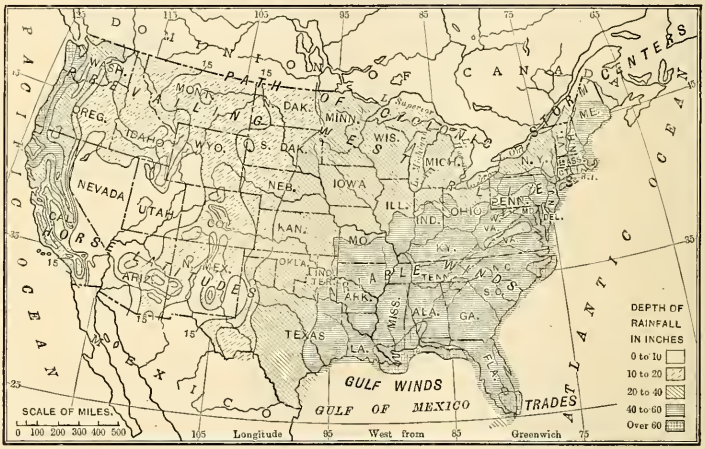


FIG. 304.

A map to show the rainfall of the United States in inches; that is, the number of inches of water that would collect all over the surface in a year if all the rain remained where it fell.

been made of the condition of variable winds in our Eastern States. One might expect that the west winds, so dry after passing over the highlands of western United States, would continue onward and cause our northeastern states to be arid also. But we know, in fact, that abundant rains fall in this section, as shown by Figure 304. We know, also, that there are no very regular winds over this vast area; on the contrary, both winds and temperature are quite changeable. In any particular locality on one day it may be warm and pleasant, with a south wind; the next day a cool, dry

wind blows from the northwest ; after two or three days this gives place to a cloudy sky and rain, brought on by south or east winds ; and then fair, cool weather sets in, with northwest winds again.

Let us inquire into the cause of these changes. From time to time out in the northwest there comes to be a place, or an *area*, of *low pressure* (Fig. 306) ; that is, an area where the air is lighter than that over the surrounding region. The air from the surrounding country, where the pressure is greater, hurries toward the low-pressure area, even from hundreds of miles away, causing winds which on the south side blow from the south, on the east side from the east, and so forth (Fig. 306). Toward the place where the pressure is low, the air is flowing in from all sides, then rising. As it rises, the vapor condenses, forming clouds and rain, as in the belt of calms. Such an area of low pressure, with its clouds and rain, is known as a *cyclonic storm area*

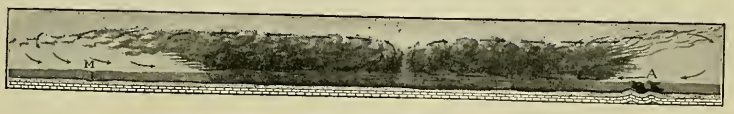


FIG. 305.

A section through a cyclonic storm to show the immense area of clouds and rain. A represents the Apphlachian Mountains ; M, the Mississippi River. The direction of the winds is shown by the arrows.

Fig. 305); and it is during these storms that most of the rain of northeastern United States and Canada comes.

Instead of remaining in one place, the cyclonic storms steadily travel onward, usually beginning in the northwest and *always* passing eastward (Fig. 307). The paths followed by the storm centres generally pass over the Great Lakes, down the St. Lawrence Valley to the ocean. They move eastward because the prevailing westerlies carry them along ; indeed, these great, whirling, cyclonic storms are apparently eddies in the prevailing westerlies, similar to the eddies in the current of a stream.

The area of country upon which rain may be falling from the clouds of one of these storms is sometimes very great, places fully a thousand miles apart sometimes receiving rain at the same time (Fig 305). As the storm moves eastward, it grows clear on the

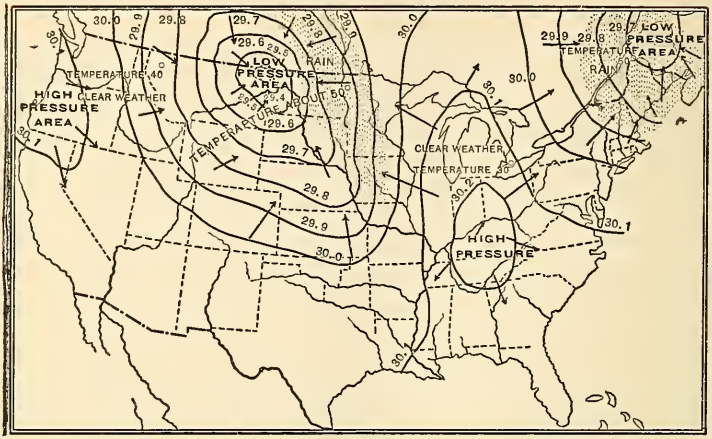


FIG. 306.

A weather map of the United States on a winter's day. The lines are lines of equal air pressure, — the lower the figure, the lighter the air (29.5 representing lighter air than 29.7). The pressure is determined by an instrument called the barometer. Study this map carefully and tell about the air pressure, winds, temperature, and rain.

western side, while the cloudy and rainy parts appear farther and farther eastward (Figs. 306 and 307).

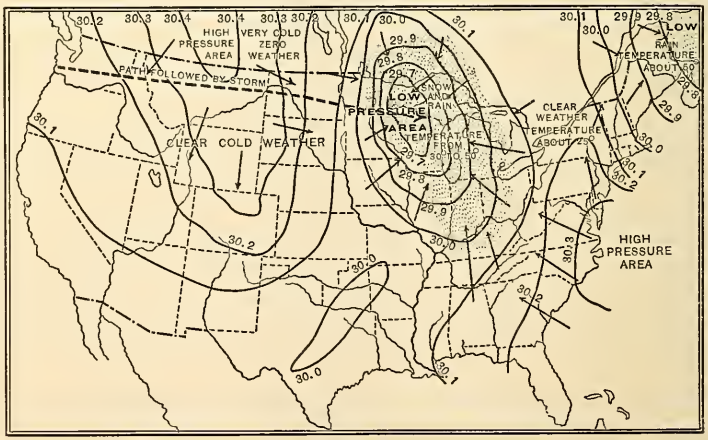


FIG. 307.

Weather map for the day following that of Figure 306. Study this carefully, and tell how it differs from Figure 306.

The vapor is brought toward the storm centre from the Gulf and the Atlantic Ocean, being carried by the winds for hundreds of miles, even into Canada. The fact that there is no high mountain range extending across southern United States is of great importance. If there were such mountains, instead of the low Appalachians and the open plains of the Mississippi Valley, the winds could not carry their vapor so far, but would drop it on the coast side, leaving the interior a desert.

Not only are rains caused by these storms, but hot spells and other changes as well. Warm winds, blowing toward the low pressure areas from the south, are the cause of the winter thaws and the summer hot spells in the Eastern States. It is during these hot spells that thunder storms come; also, in some places, *tornadoes*, often called "cyclones," in which the winds blow so fiercely that houses are torn to pieces.

After a low pressure area has passed eastward and the storm is over, the wind generally blows from the west. This causes cool, dry weather in summer, and cold snaps in winter. Then it is said that a *cold wave* has come; and this, sweeping over the East, and even far into the South, often does great damage to fruit trees and other delicate plants.

Weather Maps. — Figure 306 shows a cyclonic storm in the northwest, the arrows indicating how the winds blow in from all sides toward the centre of low pressure. Farther east is a region of high pressure. In Figure 307, the high and low pressure areas are again represented; but, since it is a day later, they have moved eastward; and the following day they would be still farther east. You see from these maps how the direction of the wind for any one locality has changed as the low pressure areas have passed over the country.

These storms are so regular, and their importance is so great, that the United States government has established a *Weather Bureau* which employs a large force of men, stationed in different parts of the country, to observe the pressure of air, direction of wind, etc., and to telegraph the facts to Washington. These observations, made at the same time at all stations, furnish information which enables men to foretell the weather. Their predictions are greatly aided by the fact that all of the storms and high pressure areas will move eastward.

Maps, similar to Figures 306 and 307, called *weather maps*, are also sent out. By the predictions of the Weather Bureau, farmers and gardeners are warned against damaging frosts, and sailors against severe storms. Hundreds of thousands of dollars are saved in this way nearly every year. Especially valuable service has been rendered by the Weather Bureau

in predicting the very fierce *hurricanes* that arise in the West Indies and sometimes do great damage there, as well as on our own coast. These resemble the cyclonic storms, but are much more destructive.

FIG. 308.

A cyclonic storm in Europe which came from the ocean. The heavy black line shows the course followed by its centre. Notice how the winds blow toward the centre.

Since the storms and high pressure areas have so great an influence on our weather, you will find it of interest to study the weather yourself. Watch the changes in wind, temperature, clouds, and rain; and if there is a barometer at hand, observe how it changes as the high and low pressure areas come and go. A great aid to such a study will be found in the weather maps, on which are printed full information about the weather each day and predictions for the next day. See how nearly correct these predictions are.

Cyclonic Storms in Europe. — Europe is also largely under the influence of the prevailing westerlies; and cyclonic storms often cross the ocean and reach far into Eurasia (Fig. 308). There, as here, the extent of the country upon which rain may be falling from the clouds of one of these storms is sometimes very great. The weather likewise is made changeable by these storms. That is, in any particular locality it may be warm and pleasant one day, stormy the next, then clear and cool or cold. Similar cyclonic storms develop in the prevailing westerly belt of the southern hemisphere, where they bring changes of weather to southern South America, Australia, and the islands of the great Southern Ocean.

Sea and Land Breezes; Monsoons. — There is one other great source of disturbance of the regular wind belts of the earth and of

the rain belts that are dependent upon them. This is found in the difference in temperature between land and water.

Land warms and cools much more quickly than water. How hot the stones feel in summer compared with pond water! And how quickly the ground freezes in autumn, while we are still waiting for skating on the ponds! In the same way, the land along the seashore on a hot summer morning soon becomes warm, and the air above it is heated, as over a stove, so that it expands and grows light; but that over the water remains cool, like the sea itself. This cooler air then pushes in toward the shore; and thus a breeze from the sea, or a *sea breeze*, is created. In summer, such a breeze is frequently felt at the seashore and along the shores of large lakes, and it helps to make the temperature so agreeable that many people resort to those places during warm weather. At night, the land cools more rapidly than the sea; and then the cool air from the land moves out toward the sea, forming a *land breeze*.

Likewise, in summer the continents as a whole become warmer than the oceans; in winter they become cooler. And in some parts of the world these differences create winds on an enormous scale. Such winds exist in Mexico and our Gulf states; but in Asia they are far more important.

The interior of that continent is so far from the ocean, that there are naturally very great extremes of temperature. During the winter, the heavy air over the cold land settles down as drying air, and presses outward beneath the warmer air which lies over the ocean. This produces dry land winds. In summer, on the other hand, the air over the cool water crowds in, raises the hot air of the continent, and produces ocean winds and rain. This is well illustrated in the southern part of Asia. Heated by the nearly vertical rays of the sun during the northern summer, the land there becomes warmer than the ocean. Toward this heated area the cooler air from over the Indian Ocean crowds in, causing ocean winds.

This makes the summer winds opposite in direction to those of winter when the air from the cold lands of interior Asia is flowing out toward the warmer Indian Ocean (Fig. 310). Winds of this kind, which blow in opposite directions in different seasons, are

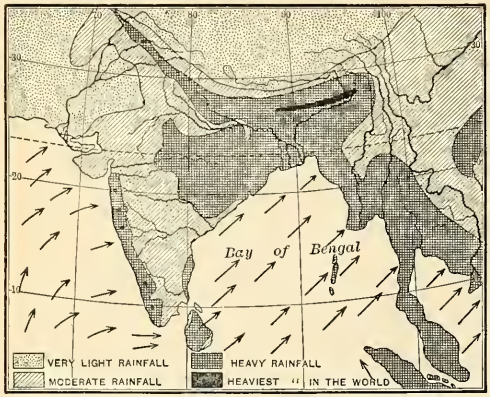


FIG. 309.

The winds and rainfall during the summer monsoon of India.

better developed in India than in any other part of the earth, and it was there that they received their name, *monsoon* winds. The term monsoon is now applied to inward-flowing summer winds and outward-flowing winter winds of any large mass of land.

When the summer monsoons blow, the rainy season comes in India (Fig. 309). The rainfall is especially heavy where the moisture-laden air ascends the steep slope of the Himalayas. In one part of this district, opposite the head of the Bay of Bengal, there is three times as much rain in July alone as falls in well-watered portions of the United States during the entire year. The winter monsoon, on the other hand, is so dry that vegetation withers and the soil becomes parched and cracked, as in a desert (Fig. 310).

While the north and south temperate zones are both called *temperate,* and have many features in common, they are quite unlike in their winds. In the northern hemisphere the broad continents become very hot in summer and cold in winter. Since the temperature of the oceans remains more uniform, the regular winds are greatly interfered with, as by the monsoons. In the south temperate zone, on the other hand, there is little land and a vast expanse of ocean. The tempera-

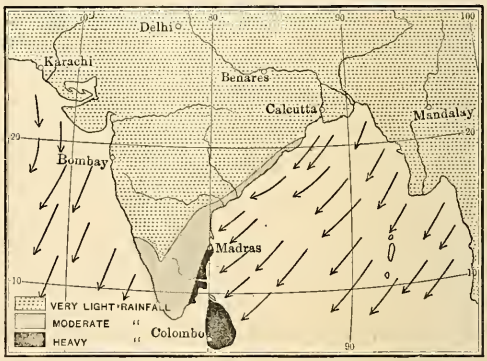


FIG. 310.

Map of the winter monsoon winds and rainfall of India. Compare with Figure 309, and notice especially how very light the rainfall is in one season and how heavy it is in the opposite season.

ture of the water changes but little, and the narrow lands have their temperature largely determined by winds from the oceans. In the south temperate zone, therefore, there is little chance for monsoons.

REVIEW QUESTIONS: (1) Tell about the directions of the regular winds of North America. (2) Describe the circulation of air in a room heated by a stove. (3) Compare this circulation of air with that in the regular winds of the earth. (4) What effect has rotation on the direction of these winds? (5) What are the names of the regular winds of North America, and over what sections of the continent do they blow? (6) Locate and describe the wind belts of the earth. (7) What proofs have we that these are permanent winds? (8) Tell about the movement of air in the belt of calms. (9) In the horse latitudes. (10) What is the effect of the earth's revolution on the location of all of these belts? (11) Tell about the causes of rain. (12) Show how the trade winds and westerlies affect the rainfall of North America. (13) What about the rainfall in northern South America and in the Hawaiian Islands? (14) How do you account for the desert of Sahara? (15) Tell about the rainfall in Europe. (16) In South America, just south of the equator, and in Australia. (17) In the belt of calms. (18) Show how the migration of the wind belts affects rainfall, and give an example. (19) Tell about the winds and rain in eastern United States and Canada. (20) About weather maps, and the value of the Weather Bureau. (21) What about the cyclonic storms in Europe? (22) Give the cause of sea and land breezes. (23) Of monsoons. Give example. (24) Why do monsoons interfere with the regular winds much less in the southern than in the northern hemisphere?

SUGGESTIONS. — (1) Estimate the number of barrels of water that falls on an acre of ground, or upon a city block, in one year, where the rainfall is forty inches. (2) How is a movement of air secured in your schoolroom in order to ventilate it? (3) Make a drawing to show the direction of the regular winds of the world. (4) Watch the higher clouds to see in what direction they are moving. (5) Examine a map sent out by the Weather Bureau. Perhaps your teacher can have them sent regularly by writing to the Weather Bureau at Washington. (6) Read once more the section on "Air" in the First Book, page 71. (7) Write an account of the change in the weather for five days in succession: — the wind direction and force; the clouds; rain; temperature; and, if possible, the air pressure. (8) Read the chapter on cyclonic storms in Tarr's First Book of Physical Geography, pp. 102–125.

For REFERENCES, see page 439.

III. OCEAN MOVEMENTS AND DISTRIBUTION OF TEMPERATURE

Like the air, the ocean water is in motion, its three principal movements being wind waves, tides, and ocean currents.

Wind Waves

Waves are formed by winds which blow over the surface of the water and ruffle it, sometimes, during storms, causing it to rise and fall from twenty to forty feet.

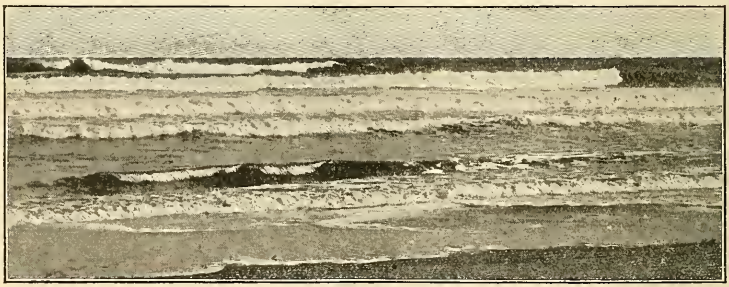


Fig. 311.

Surf on the New Jersey coast, caused by the breaking of the waves as they approach the beach.

In the open ocean, waves are rarely very dangerous to large vessels; but upon the seashore, they do great damage to vessels and even to the coast itself, wearing away the rocks and dragging the fragments out to sea. The constant beating of the waves (Fig. 311) is slowly eating the coast away.

Tides

What the Tides are. — People living upon the seacoast are familiar with the fact that the ocean water rises for about six hours and then slowly falls. This rising and falling of the water twice each day forms what is known as the tide. For a long time men were puzzled to explain this : it was called the breathing of the earth, and

by certain uncivilized races it is to this day thought to be caused by some great animal.

As a result of careful study, we have learned that the tides are caused by the moon and the sun, especially the former. Each of these bodies is pulling upon the earth, by the attraction of gravitation, as a horseshoe magnet pulls upon a piece of iron. When the sun and moon pull upon the earth, the ocean, being a liquid that can be moved, is drawn slightly out of shape. This causes two great swells, or waves (Fig. 314), many hundreds of miles broad, to pass around the earth, following the moon. When these swells reach the shores, they cause the rise of water known as the tide.

FIG. 312.
High tide on a part of the New England coast.

Height of the Tidal Wave. — The tidal wave is only two or three feet high upon headlands which project into the open ocean ; but it rises a great deal higher in many bays. There the wave is raised higher because the space that it occupies becomes narrower near the head of the bay. In some such places, as in the Bay of Fundy, the tide reaches a height of forty or fifty feet.

FIG. 313.
The same region as Figure 312 at low tide. Compare the two figures.

The height of the tide also varies from day to day, for the moon and sun, which combine to form it, do not always work together. At new moon and full moon, when the earth, moon, and sun are nearly in a straight line, the moon and sun pull together and make the tidal wave higher than at the quarter. The high range of tides at full and new moon are called *spring* tides, those at the quarters, *neap* tides.

Effects of Tides. — In the open ocean the tides are of no importance, and a sailor might spend weeks at sea without ever knowing that there were tides. But along the coast, where the water rises and falls against the beaches and cliffs, the tides are very noticeable (Figs. 312 and 313) and important.

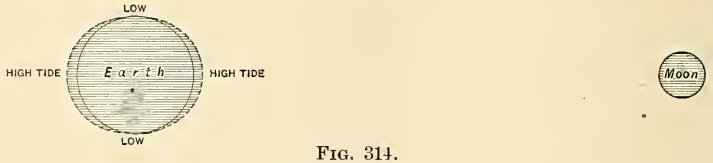


FIG. 314.

A diagram to show how the moon pulls upon the earth and causes the tide waves. Of course their height is not so great as the diagram suggests.

Where the coast is irregular, the tide is often changed to a *current*, which sometimes moves so rapidly that a sailing vessel cannot make headway against it, but must wait until the tide changes. Such a rapid current is found in one of the entrances to New York harbor, at what is known as Hell Gate, where the channel is narrow and rocky.

These tidal currents, moving in one direction during the incoming or *flood* tide, and in the opposite direction during the outgoing or *ebb* tide, not only aid ships which are going with them, and retard those going against them, but they sometimes drift vessels out of their course and place them in dangerous positions. Many a ship has been lost by being wrecked upon a coast where it was drifted by the tidal currents.

Another effect of the tidal currents is upon the harbors. These currents often carry sand hither and thither and build bars opposite the mouths of harbors. This is one of the reasons why the harbors of our Southern States are no better (p. 14). In order to prevent some of them from being entirely shut in by bars, the government is obliged to spend large sums of money every year in order to remove the sand brought by the tidal currents. On the other hand, high tides are of great value to navigation by deepening the water. Even in New York harbor, the largest vessels must sometimes anchor for several hours, waiting for high tide, in order to avoid striking bottom when entering or leaving the port.

Ocean Currents

Cause of Ocean Currents. — The winds which blow over the ocean, forming waves, also drive the water before them. You may do this in a small way by blowing on the surface of a pail of water. This starts a current, or *drift*, of surface water in the direction that the air is moving. Where the winds are steady, as in the trade wind belts, or moderately steady, as in the prevailing westerlies, there is a permanent drift of water, pushed along by the prevailing winds. These form the great system of ocean currents (Fig. 318) which have such an important influence on the earth.

Differences of temperature are also a cause of some movement, as in the case of the air. But since the sunlight cannot reach to the bottom of the ocean, the water there is not warmed, as the lower layers of the air are. Therefore a circulation exactly like that of the atmosphere is not found in the ocean. There is, however, a slow settling of cold water in the frigid zones, a movement along the ocean bottom, and a very slow rising in the torrid belt. While this movement is so slight that it can scarcely be noticed, it is because of this drift of water that the temperature of the ocean bottom is so low. Even at the equator, the the ocean bottom temperature is nearly at the freezing point.

In our study of North America it was several times necessary to refer to the Gulf Stream and the Labrador Current. We willnow study the currents on each side of our continent more fully.

The North Atlantic Eddy. — In the eastern part of the Atlantic where the trade winds blow, the surface water drifts slowly in the direction of the trade winds; that is, toward the belt of calms (Fig. 296). It then drifts westward, as a great *equatorial drift*, until the easternmost extremity of South America interferes with its course. There the drift of water is divided, a part being turned southward, while the greater portion proceeds northwestward.

The part which flows northward is deflected toward the right by the effect of rotation, as the winds are (p. 260); and the part which flows into the South Atlantic is turned to the left, also by the effect of rotation. Therefore, the northern drift, instead of coming near to the mainland of North America, keeps turning to the right,

crossing the Atlantic to Europe. It then passes southward, and finally returns to the trade wind belt where it started, having made a complete circuit. (Figs. 315 and 318.)

Coming from the equatorial region, this water is warm, and in it live countless millions of animals and floating plants. Among the latter, one of the most abundant is a seaweed, called *Sargassum*, which is thrown into the middle of this great eddy. There it has collected until it now forms a "grassy" or "*Sargasso*" *sea* hundreds of square miles in extent. Since the "Sargasso" Sea lies directly between Spain and the West Indies, Columbus was obliged to cross it on his first voyage of discovery; and his sailors, upon entering it, were much alarmed lest they might run aground, or become so entangled in the weed that they could not escape.

The Gulf Stream. — A portion of the drift of water which moves northward along the northern coast of South America enters the Caribbean Sea and then passes into the Gulf of Mexico. This is a

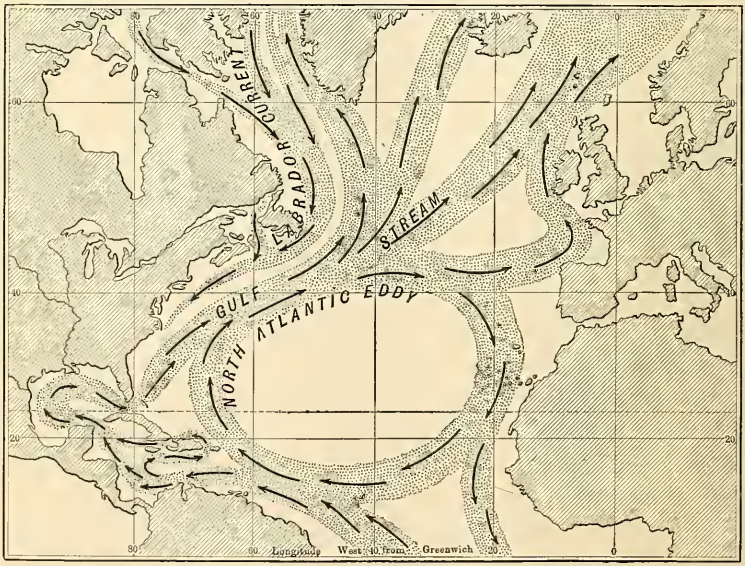


FIG. 315.

A diagram to show the currents of the North Atlantic. In order to illustrate the currents clearly it has seemed necessary to make them as if they were sharply bounded, like a river in its channel. As a matter of fact, however, the boundaries of these great currents and drifts are so indefinite that, in crossing them, one would not be able to detect the boundaries even by using the greatest care.

broad, deep, gently flowing current; and it is so nearly surrounded by the warm tropical lands that it grows even warmer than when it entered the Caribbean. After swirling round the Gulf of Mexico, it escapes between Cuba and Florida, after which it is known as the *Gulf Stream* (Fig. 315) because it comes from the *Gulf* of Mexico. Being forced to pass out through so narrow an opening, its rate of movement is much increased—even to four or five miles per hour—as water in a hose is made to increase its speed by passing through the nozzle. Measure the distance from Key West to Havana (Fig. 184).

Being turned to the right by the effect of the earth's rotation, the Gulf Stream soon leaves the American coast and flows northeastward toward northern Europe. It broadens rapidly and joins forces with the western part of the great Atlantic eddy. In crossing the Atlantic, the drift is pushed along by the prevailing westerlies, so that it reaches the shores of northern Europe, and even enters the Arctic Ocean. Some idea of its volume may be gained from the fact that it carries many times as much water as all the rivers of the world.

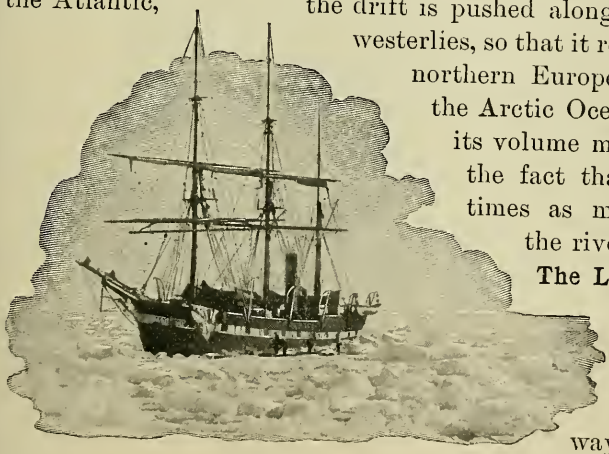


FIG. 316.

An Arctic whaling steamer imprisoned, off the coast of Baffin Land, in the floe ice which is being carried southward in the Labrador current.

The Labrador Current. — After being cooled, some of this water settles to the bottom and finds its way back to the torrid zone in the slow drift of cold water which is forever moving along the ocean bottom from the frigid zone toward the equator (p. 279). But much of it returns at the surface, for there is a cold surface current, called the *Labrador current*, passing southward along our northeastern coast (Figs. 315, 316, and 318).

The Labrador current flows down from among the islands of North America, past the coast of Labrador, Newfoundland, Nova Scotia, and New England as far as Cape Cod. Like all ocean currents in the northern hemisphere, it is turned toward the right, that is, since it flows southward, toward the west. This causes it to follow our coast very closely, keeping nearer our shore than the Gulf Stream does.

Since there are two currents near together, a cold one from the north, and a warm one from the south, a vessel sailing from Boston to England must cross both. During winter storms a ship often becomes covered with snow and ice while in the cold Labrador current, but loses this coating soon after entering the Gulf Stream.

Where the cold and warm currents come near together, a dense fog is produced. You can doubtless explain why that is so (see Primary Book, p. 77). Sailors who cross the Atlantic have learned to expect heavy fogs as they pass near the coast of Nova Scotia and Newfoundland, which is one of the foggiest regions in the world.

The Currents in the North Pacific Ocean. — In the Pacific Ocean, as in the Atlantic (Fig. 318), the water drifts westward in the belt of calms; then a broad, warm current swings to the right past Japan, crossing the ocean toward Alaska, as the Gulf Stream crosses the Atlantic toward Europe. This is called the Japanese current. Continuing to turn to the right, this great ocean drift passes southward to complete the vast eddy.

A small branch of the current turns northward along the Alaskan coast. There is also a cold current between the Japan Current and the coast of Asia, corresponding to the Labrador current in the Atlantic.

We see from what has been said, that, although the Gulf Stream flows past the Southern States, the northeastern coasts of North America and of Asia are bathed by ocean currents from the cold north. On the other hand, the northwestern coasts of Europe and North America are approached by warm drifts of water from the south.

Eddies of the Southern Oceans. — In the South Pacific, South Atlantic, and Indian oceans, the same causes have produced eddies similar to that of the North Pacific; but here the earth's rotation deflects the winds to the left, as we know, and the waters are moved

in the same direction. Some of the water of these eddies joins the broad West Wind Drift of the distant southern ocean; but much of it turns northward until it once more reaches the trade-wind belt, thus completing the eddies (Fig. 318).

Effects of Ocean Currents in North America: Review. — The cold Labrador current greatly affects the temperature upon the land, for winds blowing over it carry the chill far inland. This is one of the reasons why the east winds of New England are so cool, and why the New England coast is such an agreeable summer resort.

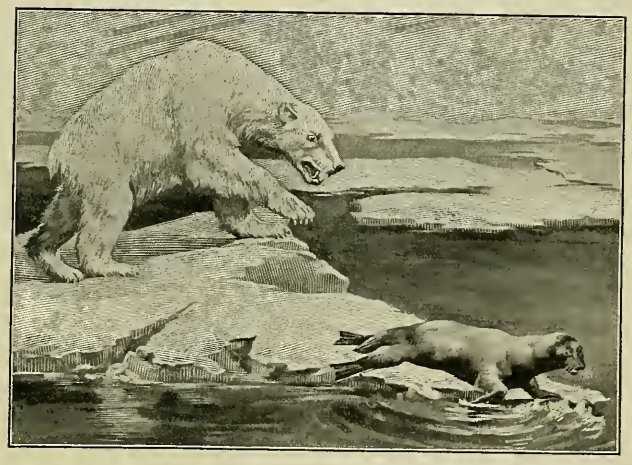


FIG. 317.

Polar bear and seal on the floe ice of the Labrador current.

Since the Labrador current flows as far south as Cape Cod, the water north of this promontory must be cooler than that south of it. As the cold current leaves the Arctic region, it bears with it much sea ice which has been frozen during the preceding winters (Fig. 316), and also gigantic icebergs which have broken off from the Greenland glacier. It is upon this drifting ice that the polar bear spends much of his time hunting for seals which live in great numbers in the ice-covered waters (Fig. 317).

The icebergs may be carried southward one or two thousand miles before the air and water melt them away (see limit of icebergs on Fig. 318). Indeed, some icebergs float even as far south as the paths followed by vessels which cross the Atlantic. Since many bergs are larger than

the greatest building in the world, collision with one means shipwreck; therefore sailors need to use great caution, especially when the ship is in the fog.

The cyclonic winds from the *Gulf Stream* greatly temper the climate of eastern United States, while at the same time they bring to us much vapor gathered from over these warm waters.

Again, since this west wind drift crosses the Atlantic in a northeasterly direction, it hinders the passage of vessels bound westward, or *against* its current. Benjamin Franklin noticed this effect of the current when he was Postmaster General of the American Colonies shortly before the Revolutionary War. He arranged for the carrying of the mails by ship between England and America, and one fact that he observed was that it took less time for vessels to go to Europe than to return. After studying the matter carefully, he decided that the Gulf Stream was the cause.

The warm currents of the Pacific Ocean render the southern part of Alaska far warmer than southern Labrador, which is farther south; and the prevailing westerlies bring an abundance of vapor to the Pacific coast all the way from California to Alaska. Where these winds blow, the winters are mild and the rain heavy; but the summers are cool and pleasant, because the ocean water, though warm, does not become greatly heated. Notice on a globe that the state of Washington, with its pleasant climate, is about the same distance from the equator as the bleak island of Newfoundland, whose shores are bathed by the cold Labrador current.

Effects on Other Regions. — The Gulf Stream drift is of special benefit to the Old World. It has been estimated that its waters carry one-half as much heat into the Arctic as reaches it from the direct rays of the sun. When Nansen started on his famous journey toward the north pole, he entered the Arctic Ocean with this current. Thus, since its warm water keeps that part of the Arctic free from ice in summer, he was able to proceed much farther than he otherwise could have gone. Owing to this warmth, Russia is able to have a harbor on the very shores of the Arctic. Name it. Westerly winds, warmed in passing over this drift, have made possible the great civilized nations of northern Europe, the fatherland of so many Americans.

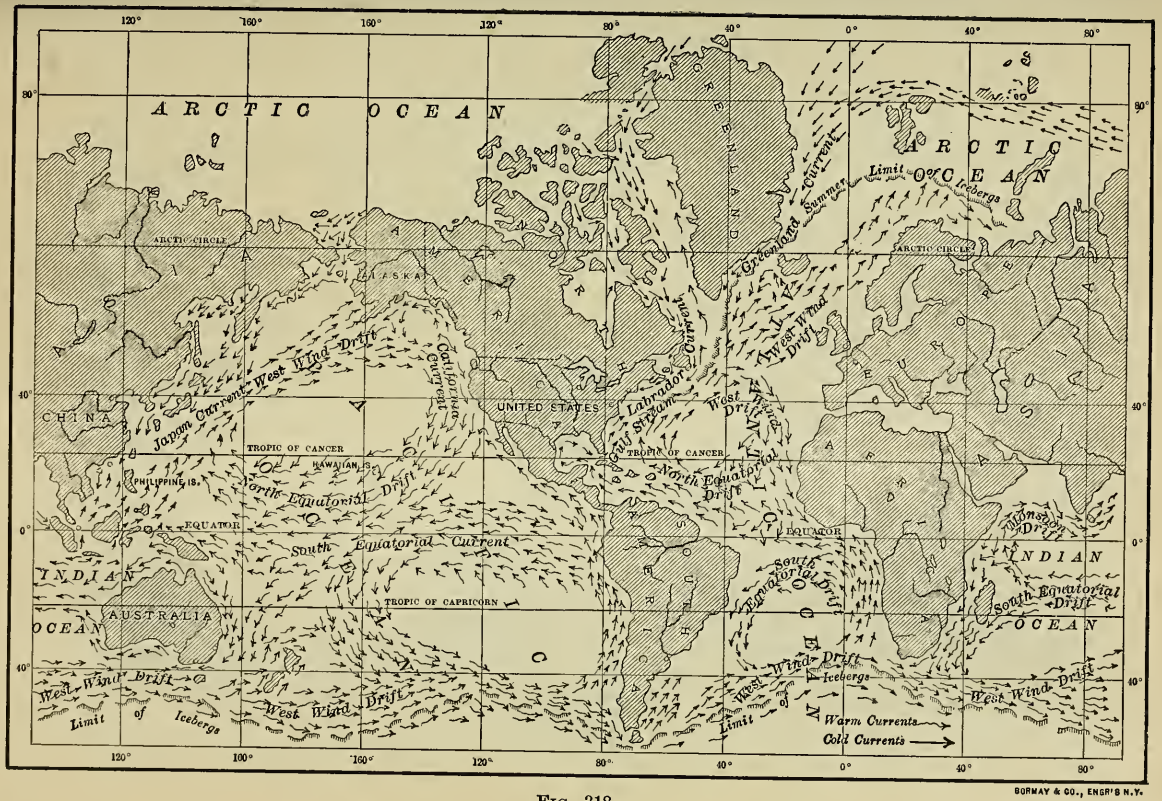


FIG. 318.

A chart showing the principal ocean currents and ocean drifts of the world. Study this map carefully. Make a sketch map somewhat like it. Compare the direction of the currents with that of the winds in Figure 296.

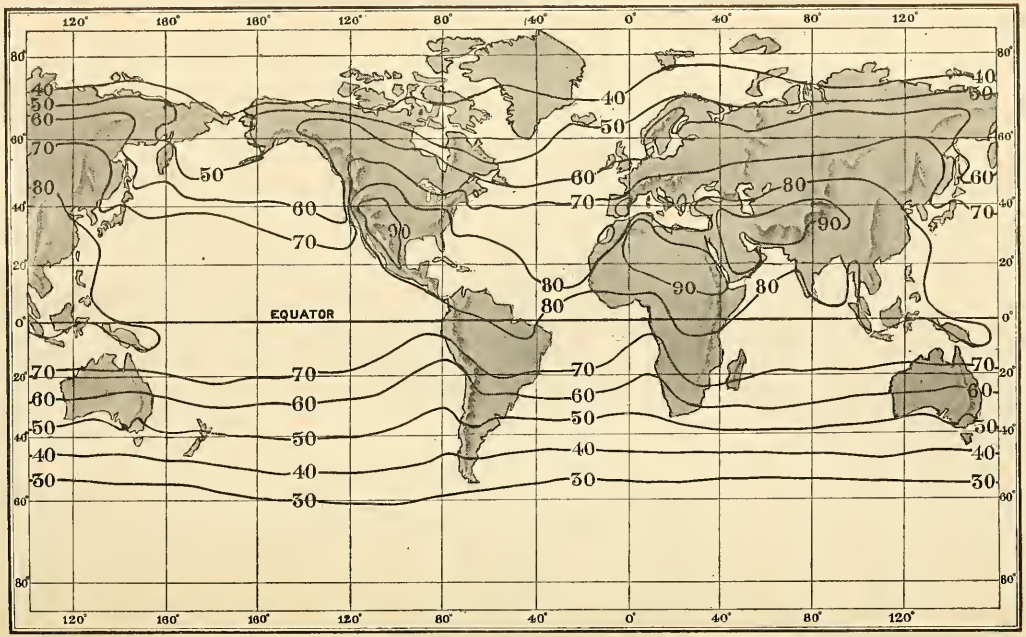


FIG. 319.

An isothermal chart of the world for July.

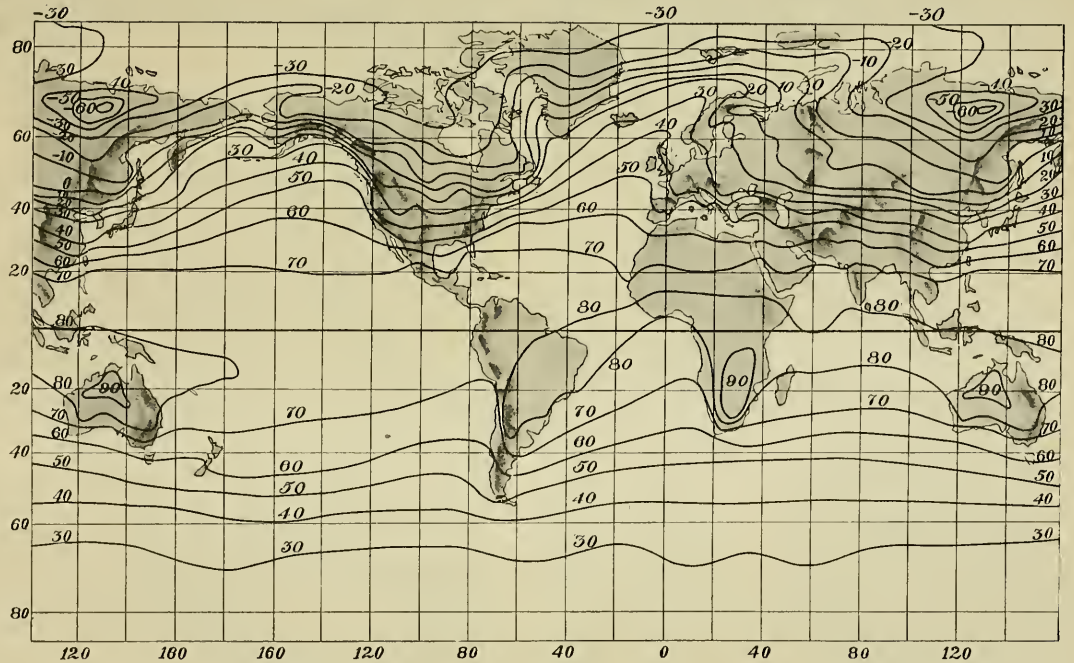


FIG. 320.

An isothermal chart of the world for January.

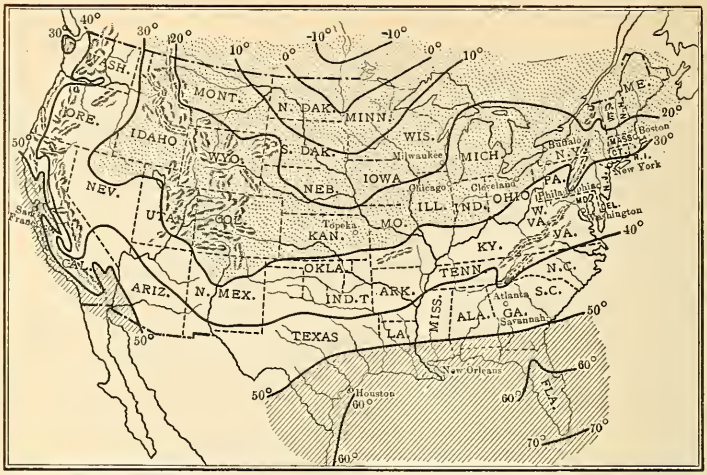


FIG. 321.

Isothermal chart of the United States for January. Why is it colder in the interior than on the east coast? Why so warm on the west coast? Can you notice any influence of mountains?

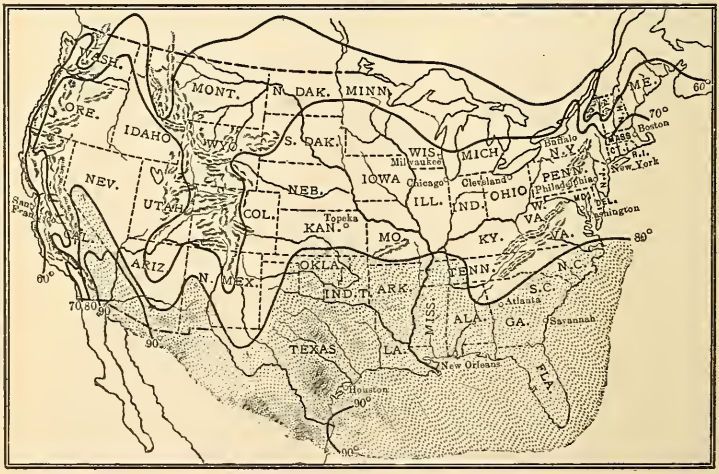


FIG. 322.

Isothermal chart of the United States for July. Notice the influence of the Rocky Mountains. Of the Appalachians. Why is it cooler on the west coast than on the east coast? What makes the isotherms bend northward in the Mississippi Valley?

Notice on a map how many large cities are in that part of northern Europe which is the same distance from the equator as desolate Labrador. What a striking contrast these nations present to the scattered savages of the latter dreary country, whose winds come either from the land or from over cold ocean water.

When our first settlers came from England they expected to find in the New World a climate like their own in the same latitude. They were unprepared for the severe winters which they actually found, and thus the first settlements on the New England and Canadian coasts were failures.

Besides thus influencing so much of the earth, the Gulf Stream, like other warm currents, has helped to form a great number of islands. Where warm currents flow, the water is often warm enough for corals to live; and, since the moving water brings to them an abundance of tiny animals for food, colonies of corals flourish, and their skeletons gradually form reefs. In this way the southern half of Florida, the Bahamas, the Bermudas, and many of the islands in the South Pacific, were built.

The cold current on the northeast coast of Asia affects that region much as the Labrador current affects northeastern North America. Its winds chill the Siberian coast, and cause the harbors, like that of Vladivostok, to be icebound in winter. This explains why Russia has leased the Chinese harbor at Port Arthur south of Korea, as a terminus of the great Siberian railway, — that her commerce and warships might not be shut up in winter.

Distribution of Temperature

In general, it is true that the farther north we travel from the equator, the colder it grows; but this is by no means always the case. If the earth were made of one solid, level substance, like glass, the temperature *would* gradually decrease from the equator to the poles. Then all points the same distance from the equator, as all on the Tropic of Cancer, or all on the Arctic Circle, for instance, would have the same temperature.

But we have seen that there are several causes which interfere with this regular decrease in temperature toward the poles. For example, (1) high mountains have a cold climate, even though in the

torrid zone ; and, for the same reason, plateaus may be colder than lowlands far north of them.

Besides, that, (2) land warms and cools much more rapidly than water (p. 273), so that land becomes hotter in summer and colder in winter than the ocean. Thus, in northern Minnesota, far from the coast, the average temperature in January is below zero, while in July it is about 65° (Figs. 321 and 322). In New York City, on the coast, the average in January is about 25°, and in July not quite 75°. On the west coast, in the state of Washington, where the winds are blowing from the ocean, the average temperature for January is 40°, and for July 60°.

At Key West, Florida, which is surrounded by water, the average temperature in January is about 70°, and in July about 85°. Where the temperature changes so little, the climate is said to be *equable*.

The winds (3) greatly influence the temperature. Where they blow from the ocean, they cause an equable climate, as in California, near San Francisco ; but where they blow from the land, they are cool or cold in winter and warm in summer. This is true of the Eastern States, where most of the winds blow from the land, though some of the damp winds come from the ocean.

Another cause (4) for different temperatures in places equally distant from the equator is found in the ocean currents. We have just seen that the Gulf Stream drift warms the air, while the Labardor current cools it, and thus by winds from these waters the temperature is affected over a very wide area.

If, therefore, we were to draw a line across the continent, connecting several points that have the same average temperature during any one month, or during the entire year, it would need to be a very crooked one, with some parts reaching much farther north than others. Such lines tell so much about temperature in so little space that it is the custom to make maps to show them, as in Figures 321 and 322. Since the lines connect the places having the same temperature, they are called *isothermal lines* or *isotherms*. (The first part of the word means *equal*, and the latter part *heat*.) A map or chart showing the isotherms is called an *isothermal chart* (Figs. 321

and 322). Trace several of the isotherms across the United States, and explain why they bend as they do.

Note that on the western coast the isotherms extend northward and southward almost parallel to the coast, since the prevailing westerlies bring to the land the nearly uniform temperature of the Pacific. There is only about 20° difference between winter and summer temperatures on the western coast of North America. But on the eastern coast of the United States the difference between summer and winter is much more marked, because, while some of the winds are from the ocean, still more are from the land, which is cold in winter and warm in summer.

Figures 319 and 320 show similar isotherms for the world. Observe how these bend toward the equator where they cross mountain chains. Comparing these two figures, you will notice how the winter isotherms of the north temperate zone bend *toward* the equator over the continents, for reasons given in (2) above. During the summer, on the contrary, the isotherms curve poleward. On what continent are these bends most striking? Why? Explain the effect of the Gulf Stream drift as shown in Figure 320.

The reason is evident why the isotherms of the North Atlantic are close together as they leave America, but spread apart like a fan toward the Old World. On the American side the currents approach each other, one from the north bearing Arctic cold, the other from the warm south. This causes great temperature contrasts between our northern and southern coasts. On the European side one part of the ocean drift passes northward, raising the temperature and bending the isotherms far northward. The remainder turns southward and, being somewhat cooler than the region into which it enters, slightly lowers the temperature and bends the isotherms southward. Thus the isotherms are spread apart.

REVIEW QUESTIONS: *Waves and Tides.* — (1) Of what importance are the waves? (2) How often does the tide rise and fall? (3) What causes it? (4) What causes it to vary in height from place to place? (5) From time to time? (6) What important effects have tides?

Ocean Currents. — (7) Explain how winds help to produce ocean currents. (8) What is the cause of the cold water on the ocean bottom? (9) Describe the drift of tropical waters in the Atlantic. (10) Trace the drift which passes outside

of the West Indies to the European coast. (11) Describe the Gulf Stream. (12) Describe the Labrador current. (13) Trace the currents in the North Pacific. (14) What coasts mentioned are bathed by warm currents? By cold currents? (15) Tell about the eddies in the southern oceans. (16) In what ways is the Labrador current of importance? (17) Tell about Franklin's discovery of the Gulf Stream. (18) What influence has it in North America? (19) What is the influence of the Japanese current? (20) Tell about the influence of the Gulf Stream on the Arctic Ocean. (21) On Europe. (22) On the building of coral islands. (23) What is the effect of the cold current flowing along the northeast coast of Asia?

Distribution of Temperature. — (24) What about the change in temperature from equator to poles, if the earth were a round ball of glass? (25) How is this change interfered with? (26) What is an isothermal line? (27) An isothermal chart? (28) Relate some facts about the isothermal lines for the United States. (29) About those for the world.

Suggestions. — (1) If your home is upon the seacoast, find out about the high and low tides for several days in succession. (2) Notice the relation between the height and the time of high tide, on the one hand, and the changes in the moon, on the other. (3) Does the government spend money near your home to remove materials which the tidal currents have brought? (4) What course might a vessel take in order to be carried from Europe to America and back again by ocean currents? (5) What precautions do vessels take to avoid running into one another in dense fogs? (6) How do they try to avoid collisions with icebergs? (7) Learn more about Nansen's voyage. (8) Which of the isothermal lines on Figures 321 and 322 is nearest to your home? (9) Which isotherm on Figure 321 runs near New York and northern New Mexico? Near Savannah and San Francisco? Through southern Maine and southern Nebraska? (10) On Figure 322, which isotherm runs through northern Maine and San Francisco? (11) How about the distance of these points from the equator? (12) Does the presence of a warm or cold current near a certain country necessarily greatly affect the climate of that country? (13) Locate the cold ocean currents of the world; the warm currents. (14) Estimate the length of the circumference of the great eddy in the North Pacific.

(15) How does Figure 320 show the effect of the cold current on the northeastern coast of Russia?

(16) Why are the isotherms so much more nearly parallel in the southern hemisphere than in the northern (Figs. 319 and 320)?

IV. PLANTS, ANIMALS, AND PEOPLE

Zones of Life. — As there are three zones of climate, — tropical, temperate, and frigid, — so there are three great divisions of life; for both plants and animals vary with temperature and rainfall. State some reasons why this must be true and give illustrations. But since there are differences of climate within each of the great zones, there must also be differences in the plant and animal life. We shall now study about some of the great life zones.

Tropical Forest Belt. — The tropical zone is a region of continual warmth and, in many portions, of abundant rainfall. Name some of the sections in this belt that have heavy rainfall. In this hot climate the vegetation retains its leaves and grows throughout the year. Owing to this fact and to the abundant moisture, the foliage is very heavy (Fig. 323) and the ground is densely shaded. Among the trees there are many of great value either for their wood, their sap, or their fruits. Mention some of them. Name some valuable food plants that grow only in tropical regions.

The dense foliage of the forests greatly hinders evaporation, and renders the atmosphere so damp that many plants thrive with their roots in the air instead of in the soil. Aside from trees, therefore, there are vines and hanging plants without number, some of the most beautiful kinds being the orchids, which abound. The forest tangle thus produced is almost impenetrable.

The labor required to clear land which produces such vegetation — and to keep it clear for farming — is far greater than in the temperate forest regions of the United States. This difficulty is increased, too, by the extreme heat and by the unhealthfulness resulting from dampness. For these reasons, in spite of the great fertility of the soil, the zone of dense tropical forests is almost everywhere sparsely inhabited; and in nearly every case its inhabit-

ants are savages. They have become accustomed to the climate, and, owing to the ever-present supply of food which the surrounding trees and bushes afford, they find little work necessary. On the other hand, there is an enormous variety of animals in this forest belt. Can you give reasons why?

Among the animals insects are especially abundant. Some, like the beautiful butterflies, thrive because of the abundance and variety of

Fig. 323.

A scene in the dense tropical forest of the belt of calms.

tropical flowers; others, like many species of ants, live in the decaying wood; and still others have their homes in the ground. Some are harmless; but many, like the ants, which swarm in great numbers, are very troublesome.

Where there is much fruit and insect life for food, birds abound; and the variety and beauty of the humming-birds, parrots, paroquets, birds of paradise, and other species of bird life in the tropical forest, are far famed.

Among the mammals there is less variety and abundance, the greatest number, as the monkeys and sloths (Fig. 339), being tree-dwellers. Others, like the tapir, live in the swampy undergrowth; and some very large

animals, like the rhinoceros and elephant, still live in the dense forest, where it is difficult to hunt them. Occasionally, too, fierce animals, such as the tiger (Fig. 324) in the Old World, and the jaguar in the New, lurk in the densely growing vegetation, ready to pounce upon the more defenceless, plant-eating animals.

Reptiles also thrive in the warmth and dampness of the forest. Great snakes twine themselves like huge vines among the trees and underbrush, and poisonous serpents are common. The standing bodies of water encourage water life, — for example, the turtle and alligator among reptiles, and the hippopotamus and manatee among mammals.

FIG. 324.
The tiger of India.

Savannas. — On either side of the tropical forest is a belt where the temperature is always high, but where the rainfall varies with the season, being rainy when the belt of calms migrates to it, and dry in the opposite season when swept by the trade winds (p. 268). This belt of alternate dry and moist conditions is best developed in the interior of continents, and is rarely found on east-facing coasts. Why not?

Owing to the absence of rain during one season, dense forests are impossible; but some plants, such as grasses, thrive. These are therefore grass-covered lands and are known as *savannas* (Fig. 325).

The *downs* of northern Australia, the *park lands* lying both north and south of the equator in Africa, the *campos* of Brazil, and the *llanos* of Venezuela and Columbia, are all examples of savannas. They are dry and barren in one season, fresh and green in the other. Trees, such as palms, line the streams; but elsewhere the land is open. Grass-eating animals roam about; for example, in Africa the antelope, gazelle, zebra, giraffe, buffalo, elephant, and rhinoceros. In addition there are some flesh-eating animals, such as the lion (Fig. 326).

While tropical forests are unsuited to the life of any persons but indolent savages, the open savannas invite human inhabitants in spite of the heat. They also *compel* industry, because provision must be made for the period of drought. Therefore those African negroes who inhabit the grass lands keep flocks and carry on rude forms of agriculture. Where settled by white men, these savannas are to-day mainly grazing lands; but they are no doubt destined to

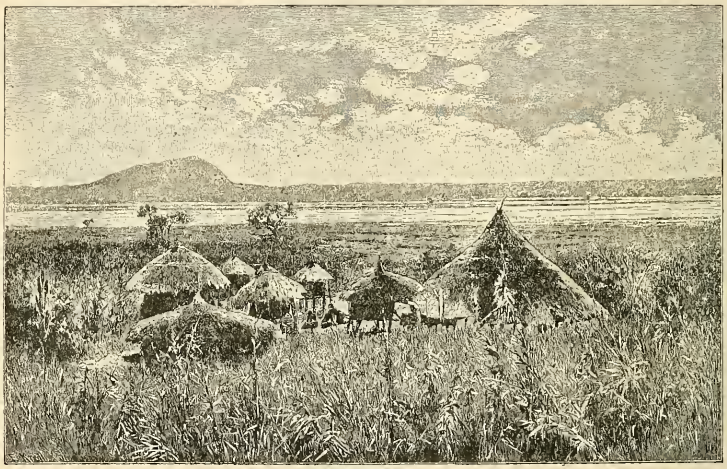


Fig. 325.

Negro huts on the savanna along the Upper Nile.

become the seat of important agriculture, for they are adapted to the cultivation of many subtropical plants.

The Desert. — While the savannas grade into tropical forests on the side next to the equator, they are gradually replaced by deserts on the other side. Locate these deserts in Australia south of the equator; in Asia north of the equator; and in Africa and America on both sides of the equator (Figs. 298–301). Explain their aridity.

In the desert there are vast stretches in which the sand is moved before the wind and piled into sand hills, or *dunes*. There are also tracts glistening with salt where the water of interior basins has evaporated and left salt upon the surface. Parts of the desert are broad plains; but there are also stony plateaus, deep valleys, and

mountain ranges (Figs. 488 and 517). Throughout much of the desert there is such a lack of rain that the surface is barren and desolate at all times.

But even there, plants and animals are not entirely lacking. In some sections there are scattered clumps of coarse grass; and there are prickly plants, like the cacti and the acacias, in which the leaves and stems are as small as possible to prevent evaporation. In place of a dense tropical foliage there is a marked absence of leaves, and a

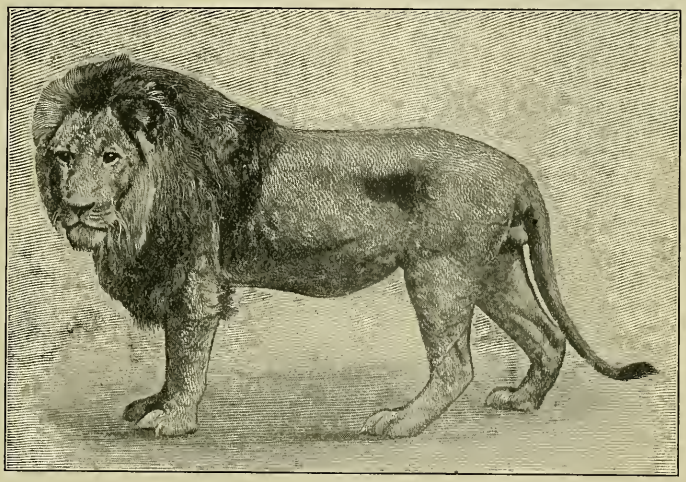


FIG. 326.
The African lion.

large part of the plant is underground. This is because the roots must struggle hard to find the necessary moisture, and the portion above ground must use as little moisture as possible and waste none; for years may pass before rain comes.

That the soil is usually fertile is proved by the fact that wherever there is fresh water, as along a stream, vegetation thrives. Such watered spots in the desert are called *oases*. The Sahara caravans halt in these garden patches, where tall date palms grow and supply a fruit of great value as a food.

One of the few animals native to the deserts of the Old World is the ostrich. Another, much used by man, is the camel (Fig. 327). The latter

well illustrates how animals become adapted to their surroundings. Each foot has a broad sole which aids it in travelling by preventing the feet from sinking into the sand. The nostrils can be closed when necessary and the eyes are protected by a veil of hair. Both of these devices are of much use in keeping out the sand which is so often blown about. The camel is further provided with pouches in which enough water may be stored to serve it two or three days; and owing to its fatty hump, which can be drawn upon for the nourishment of its body, it can also go without food longer than most other animals.

FIG. 327.
The "Ship of the Desert." Why so named?

Human beings naturally shun the desert. Permanent homes can exist only on the oases (Fig. 328); but wandering tribes, or *nomads*, roam about there. They live in temporary tents, and are engaged in herding, or in driving caravans of camels laden with articles of trade (p. 507). Sometimes they even raid the caravans of others for the booty they may obtain.

FIG. 328.
Loading a camel on an oasis in Algeria.

Life in Temperate Zones. — The land of temperate zones is typically forest covered (p. 24). This is not due to abundance of rainfall so much as to moderate evaporation in the cool climate, which permits the ground to remain moist throughout the summer. Thus a broad forest belt crosses the northern interiors of both North America and Europe. Owing to the less extensive rainfall in some parts, and to the rigor of the climate in others, the forest is more open than in the tropics.

The value of the forests to man is great, for the coldness of the climate in the densely inhabited temperate zone demands that men shall build permanent houses for their protection. To what other uses is the wood put? On the other hand, the forests have interfered with man's development, for the trees must be cut away before agriculture is possible. In Europe, however, a large part of the forest has been removed, and much has also been cleared away in the United States. What about Canada?

The forest in the temperate zone was the home of many wild animals now mostly exterminated or greatly reduced in number. Name some of those of North America. Owing to the coldness of the northern sections these animals are protected by fur, which men find of such use that the hunting of fur-bearing animals is one of their occupations in the forest.

There are also treeless, grass-covered lands in the temperate belt, usually in the interior of continents on the border of the deserts where the rainfall is light. In the Old World, where these tracts are called *steppes*, there is a broad strip extending from southeastern Europe to central Asia. The *Great Plains* of western North America, and the treeless plains, or *pampas*, of Argentina are also steppes (Fig. 351).

Fig. 329.
A group of Persian nomads with their summer tents.

Spring rains cause the grass to be green in spring and early summer; but drought then changes it to gray and yellow. There are no trees excepting along the streams; and only on the very border of the steppes is there rainfall enough for agriculture without irrigation. The wild animals are grass eaters (*herbivora*), and the steppes

formerly supported great herds of deer, antelope, and bison; but cattle, sheep, horses, and camels have largely replaced them.

The inhabitants of the steppes in the Old World have for many centuries led a pastoral life and have become *nomads*. They wander about and live in tents during the summer (Fig. 329); but in winter they select more permanent homes for the sake of protection against the weather. They depend upon the horse to such an extent that it has become almost a part of their life.

Besides the vast tracts of arid steppes, there are some treeless plains even in parts of the temperate zone where the rainfall is heavy enough for tree growth. Examples of these are the *prairies* in the United States (pp. 24 and 117), and some of the plains in southern Russia. Some think that fires have removed the forests; others that the fine-grained soil has prevented tree growth; but probably each cause has aided.

Man has developed most highly in the temperate zone, and it is with the people and industries of this zone that our study of geography is mainly concerned.

Life in the Frigid Zone. — As one passes to the colder margin of the north temperate zone the trees become stunted and the conditions grow less favorable to agriculture. Beyond this, stretch vast expanses of frozen ground known as the *tundras* (p. 20). These are covered with snow in winter; but in summer, when the snow melts, they are in most places exposed to the air.

These regions are often compared with the tropical deserts in their absence of animal life (p. 20); and the reindeer is compared to the camel because it permits a few persons to eke out an existence in the frozen desert (Fig. 330). But there are differences; the tundra is a desert because the cold prohibits most forms of life during the greater part of the year, while the tropical desert is *always* forbidding. Why?

Oceanic Life. — There is little variety in the plant life of the sea. Animal life, on the other hand, is extremely varied and abundant. Countless millions of minute creatures, floating in the surface waters, serve as food for larger species, such as the whales and the food fishes. Some of the food fishes, as the mackerel and menhaden, swim at the surface in multitudes, called *schools*. Others, as the

halibut and cod, live on the bottom, especially on the shallow Fishing Banks that are swept by the food-bringing currents.

Animals inhabit all parts of the ocean, even the deep sea and the surface water far from land. But the chief fishing grounds are the seacoast itself and those shallow banks near the coast that can be easily reached. Besides the various species of food fish, there are shellfish, such as clams and oysters; and crustaceans, such as crabs and lobsters. Among the important lower forms unsuited for food are the sponges, and the tiny corals out of whose limy skeletons many islands in the ocean have been built.

FIG. 330.

A camp on the edge of the tundra of northern Asia. What do you see in this picture?

Some of the higher ocean animals once lived entirely on land, and have slowly adapted themselves to the ocean. The polar bear, for instance, lives partly on the ice-covered sea; and many birds, as the penguins and ducks, spend part of their time in the water. The seals, related to the bears, still crawl upon the shore at times, though their natural home is now the water; but the whale never leaves the water, though he must still have air to breathe.

Distribution of Plants and Animals. — In what has been said about the tropical forests, the camel, seal, and whale, there lies the suggestion that the different sections of the earth were not supplied with

certain forms of life at the beginning which they were to preserve throughout all ages. On the contrary, it seems that plants and animals, like man himself, have been forced to adapt themselves to the conditions which surrounded them.

This is now generally believed to be the truth. Plants and animals, like the earth itself, have been constantly changing; and the wonderful ways in which they are now adapted to their surroundings is the result of ages of struggle in which tens of thousands of species have been destroyed because they could not fit themselves to the changing conditions. This conclusion finds support from a study of life upon oceanic islands.

Many islands far from land support *some* of the plants and animals that exist upon the nearest continents. For instance, the Bermudas have forms of life similar to those of North America. But many of the species living on the mainland, particularly those kinds that could not endure a long journey, are absent from such islands.

Birds, bats, and insects, being able to fly, naturally find their way to the islands. Some reptiles are also found, since, without food or water, they are able to float long distances clinging to logs. But large and highly developed mammals, like the elephant, tiger, or deer, are absent from oceanic islands.

The ocean is the greatest barrier to the distribution of animals and plants of the land; and for this reason the life in Australia is very different from that in Asia; and the African animals and plants differ greatly from those of South America. Deserts, tropical forests, and mountain barriers also offer obstacles to the free distribution of life. Man is now at work distributing life far and wide; but even man cannot transfer tropical plants to the temperate zone; nor can he make the grains of temperate zones grow in the frigid belt.

Divisions of Mankind. — Man, like plants and animals, varies in different parts of the world. He is influenced by his surroundings, as they are, and in the course of time has developed differently in the various lands of the earth. Concerning the *origin* of the human race, and its divisions, people hold different views; but mankind in general may be divided into four great groups.

Ethiopians. — Altogether there are about one and one-half billion human beings upon the earth, or twenty times the number in the United States. Of these the lowest are the negroes (Figs. 331 and 529), or *Ethiopians*, who number about one hundred and seventy-five million. This is often called the *black race*. There are many subdivisions of this group, but they are all characterized by a deep brown or black skin, short, black, woolly hair, broad, flat noses, and prominent cheek bones.

FIG. 331.
An African negro girl.

The home of the Ethiopians is Africa, south of the Sahara desert (Fig. 334), though many have been transported to other lands as slaves, and have there mingled more or less with the other races. In their original home the negroes are savages, or barbarians of low type.

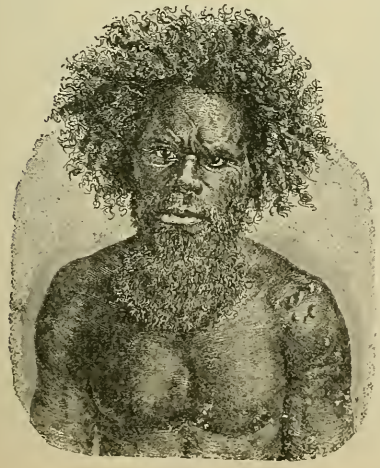


FIG. 332.
A native of New South Wales, Australia.

The native Australians (Fig. 332), the Papuans of New Guinea, the Negritos of the Philippines, and the blacks on some other islands in that part of the world resemble the negroes most closely, though differing from them in some important respects. They are shorter, for example, their hair is less woolly, their noses straighter, and their lips less thick.

American Indians. — A second great division of the human race is that of the *American Indians*, often called the *red race* (pp. 26–29). It is the smallest of the four groups, numbering about twenty-

two million. These people, who in some respects resemble the Mongolians (p. 32), were in possession of both North and South America when Columbus discovered America. They are distinguished by a copper-colored skin, prominent cheek bones, black eyes, and long, coarse black hair (Figs. 165, 345, and 358).

Mongolians. — The third division, the *Mongolian* or *yellow race*, numbering about five hundred and forty million, are typically Asiatic people, the greater number being found in Asia and the islands of the Pacific (Fig. 334).

Fig. 333.
Japanese ladies.

The Mongolians, typically represented by the Chinese and Japanese (Figs. 333 and 467), have a yellowish and in some cases even a white skin, prominent cheek bones, small oblique eyes, a small nose, and long, coarse black hair. In places, as on the more remote islands, the Mongolians are uncivilized; but the great majority may be classed as civilized people, although their standard of civilization differs from that of the white race.

Caucasians. — By far the largest and most civilized of the four divisions of mankind is the *white* or *Caucasian race*, which numbers about seven hundred and seventy million. Their original home is not known. With the dawn of history the white peoples of Europe were mostly barbarians; but civilization had begun to develop in southern and western Asia and along the shores of the Mediterranean Sea.

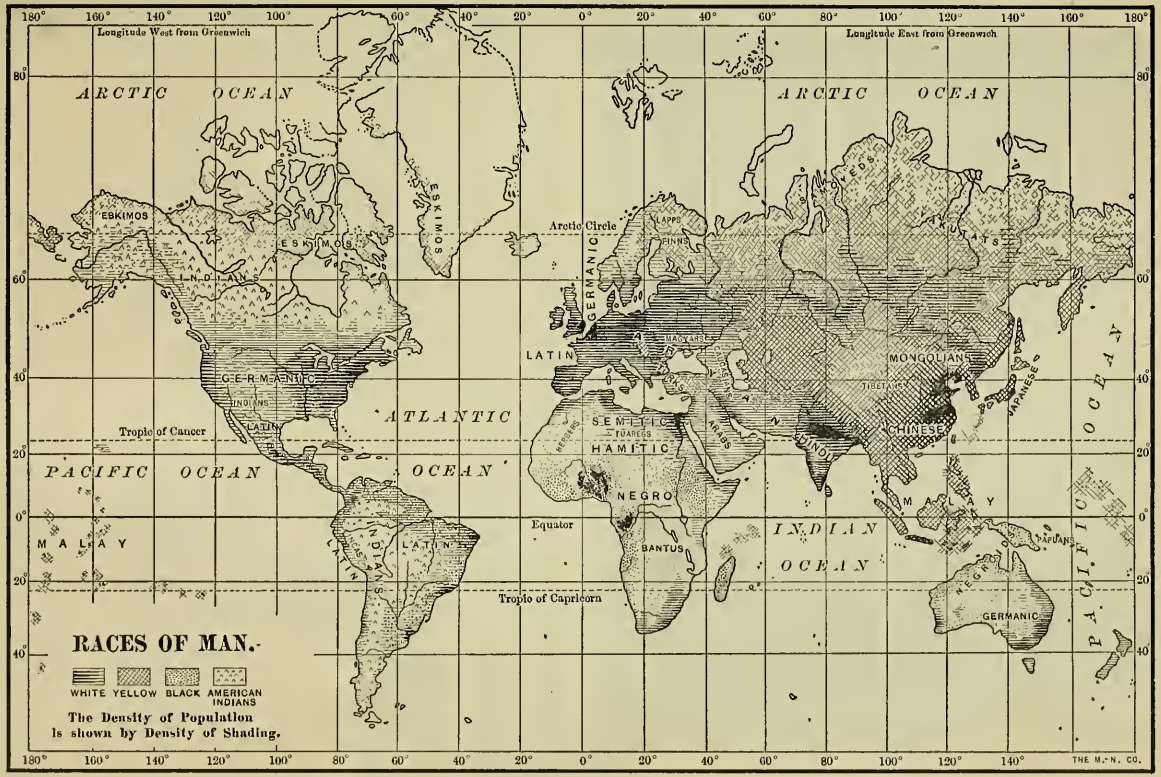


FIG. 334.

Make a sketch map similar to this to show the general distribution of the four races of man.

Fig. 335.

A group of Indian Brahmins, who belong to the dark type of Caucasians.

Fig. 336.

Diagram to show the distribution of religions. So small a map is of course true only in general — for example, it must omit many of the small sections where Christian missionaries have made converts.

While for various reasons the Caucasians differ greatly in characteristics, two main branches are recognized: (1) the fair type (Fig. 441), with florid complexion, light brown, flaxen, or red hair, blue or gray eyes, and height above the average; (2) the dark type (Fig. 335), with fair skin, dark brown and black hair, often wavy or curly, and black eyes. In temperament both are active, enterprising, and imaginative, though the fair type is more stolid, the dark type more emotional.

Fig. 337. A fetish from Africa.

Distribution of Races. — For centuries these four great divisions of the human race have been changing within themselves until there are now many subdivisions of each group. By war and invasion they have encroached upon one another, and have intermixed to some extent. But the leaders are the whites, who, having learned the use of ships in exploring distant lands, have spread with a rapidity never seen before. Also, being more advanced than the others, the white races have readily conquered the weaker people and taken their lands from them. They now dominate the world (Fig. 334), the only division that has held out against them being the Mongolians, whose very numbers have in large measure served to protect them.

Distribution of Religion. — Every race has some form of religion. Among savages it is little more than superstition. They are surrounded by nature, which they do not understand. They seek a cause, and, seeing none, are led to believe in spirits which they try to comprehend. Some they suppose to be evil, others good. Believing that these spirits have great influence over their lives, they try to win favor with them by offering sacrifices and worshipping them.

Such religion, if it may be so called, takes many forms. Some races, as the negroes, believe in witchcraft; and among them the witch doctor is sometimes more powerful than the ruler himself. To ward off evil influences charms are worn, gross rites are observed, and images or objects,

called *fetishes* (Fig. 337), are worshipped because they are believed to possess magic power. Among these objects are included fire, the sun, the earthquake, and many animals. So far as God is concerned, if these people have any conception of Him, it is of the crudest kind. The negroes, the Indians, the Eskimos, and even our own ancestors two thousand years ago had little more than this form of religion.

All people with such views as the preceding are called *heathens* (Fig. 336), and are often said to have no religion. From our point of view they have no *true* religion; but they have something akin to it.

Fig. 338.
A statue, or idol, of Buddha in India.

Among the semi-civilized and civilized races there are forms of belief in which the conception of God is higher, and the idea of future reward and punishment is taught. Of these religions five call for special mention.

Buddhism, followed especially in eastern Asia (Fig. 336), was established in India five or six hundred years before the time of Christ as a result of the work and teachings of Buddha (Fig. 338). But there are many differences in the religious beliefs and customs of the Asiatic people, and in consequence there are many sects. *Brahminism* is one of the most common forms of belief, being especially followed in India. It would be difficult correctly to describe the religions of the Asiatic people in a few words; but *idolatry*, or the worship of idols, is prevalent among them. *Ancestor worship* is common in China; and the *doctrine of caste* in India, — that is, the

doctrine of class distinction. Both of these doctrines, which are a part of their religion, are opposed to progress, as we shall see.

The *Jewish* religion, still followed by many, upholds the worship of one righteous God, as taught in the Old Testament. From this, two other religions have developed, *Mohammedanism* and *Christianity*. The prophet Mohammed lived about six centuries after Christ, and the *Koran* contains his teachings. Mohammedans deny the divinity of Christ. This religion has been spread by the sword with wonderful rapidity, especially among the semi-civilized people of Asia and Africa (Fig. 336). Many of its followers became fanatics who, believing that they thus obtained future happiness, willingly died if they could die killing a Christian.

The Christian religion, the common belief in America and most of Europe, has spread slowly, but it now numbers about 440,000,000 followers. Its success, however, must not be measured by numbers alone; for Christians make up most of the really civilized people of the world (Fig. 336). It is no accident that this is so, for Christianity has been one of the chief factors in making civilization possible.

Religious belief has had much to do with inventions and the growth of industry. The Chinese, for example, have long opposed new inventions because their ancestor worship cultivated undue reverence for past customs; also they have been unwilling to dig into the ground, for fear of disturbing the evil spirits that are supposed to dwell there. Partly for such reasons, our study of geography is chiefly concerned with Christian countries; for there we find the most varied and extensive uses of the earth in the service of man.

Review Questions. — (1) By what factors are life zones determined? (2) Describe the conditions of plant life in the tropical forest. (3) What effect have these conditions upon human beings? (4) Upon animals? (5) What is the origin of savannas? (6) Locate some of them. (7) What about plants, animals, and people there? (8) Tell about the desert: cause, characteristics, plants, oases, animals, and people. (9) Of what value are the forests? (10) Tell about the conditions of life on the steppes and arid plains. (11) What is known about the cause of prairies? (12) Give reasons for comparing the tundras to deserts. (13) Tell about ocean life: plants, food fishes, other important animals and land

animals that have learned to live in the sea. (14) What about the adaptation of animals to their surroundings?

(15) Tell about the Ethiopians; their characteristics and distribution. (16) Do the same for the American Indians. (17) Mongolians. (18) Caucasians. (19) Give reasons for the greater advance of the Caucasians. (20) Tell about the distribution of religion. (21) Give some facts about Heathens; Buddhism and Brahminism; Jewish religion; Mohammedanism; Christianity.

Suggestions. — (1) Make a collection of different kinds of wood. (2) Notice how some of them are polished for use as furniture. (3) See some orchids, if possible. (4) Visit a museum to se especimens of tropical animals. (5) Examine a cactus closely. (6) Examine and compare the foliage of some evergreens and deciduous trees. (7) Find out what is meant by *evolution* and the *survival of the fittest*, as these terms are applied to plants and animals. (8) What dangerous enemies have you observed for certain plants? (9) For certain animals? (10) Collect pictures of animals belonging to different parts of the world. (11) What members of the divisions of mankind — other than whites — have you seen in your own neighborhood? (12) What different nationalities of whites? (13) Find pictures illustrating human life in the various zones. (14) Help to make a collection of pictures for the school, to illustrate the various forms of shelter and clothing. Also find such pictures in this book. (15) Find some one who has specimens of primitive implements, as Indian arrow-heads, and examine them. (16) Find out something about the ways in which savage races ornament their clothing and person.

FIG. 339.

Some of the animals of South America.

Longitude West 60° from Greenwich
80°
70°
50°
40°
CARIBBEAN SEA
ATLANTIC OCEAN
Pt. Gallinas
Barranquilla
Cartagena
Marcaibo
Gulf of Venezuela
CURAÇAO
Puerto Cabello
La Guaira
Caracas
Barcelona
Port of Spain
BARBADOS
(To Gt. Br.)
TRINIDAD
(To Gt. Br.)
COSTA RICA
Colon
Panama Canal
Gulf of Darien
ISTHMUS OF PANAMA
Panama
Gulf of Panama
Valencia
L. Maracaibo
Barquisimeto
Delta of the Orinoco R.
L. Merida
Orinoco R.
Ciudad Bolivar
Georgetown
Paramaribo
Cayenne
Cenca R.
Magdalena R.
Bucaramanga
VENEZUELA
Medellin
Tolima Vol.
Bogota
Meta R.
Sierra Parima
Sierra Pacaraima
BRITISH GUIANA
DUTCH
FRENCH
Ibagua
COLOMBIA
Orinoco R.
Essequibo R.
Tumuc Humac Mts.
Popayan
LLANOS
Akarai Mts.
Mouths of the Amazon R.
EQUATOR
MARAJO I.
Quito
Cotopaxi Vol.
Chimborazo Vol.
Napo R.
Yapura R.
Rio Negro
Para (Belem)
Maranhão
Guayaquil
ECUADOR
Gulf of Guayaquil
Cuenca
Manaos
Santarem
Ceara
Amazon R.
Maranon R.
Pt. Parina
Paita
Piura
Yavari R.
Ucayali R.
Jurua R.
Purus R.
Madeira R.
Tapajos R.
Xingu R.
Araguay R.
Tocantins
Parnahiba R.
C. St. Roque
Parahiba
Pernambuco
Maceio
Chiclayo
Andes
SILVAS
BRAZIL
Huaraz
Falls
Pasco
Lima
Callao
PERU
Ayacucho
Cuzco
Beni R.
Mamore R.
Guaphore R.
PLATEAU OF BRAZIL
Serra do Estrondo
São Francisco R.
Bahia
Matto Grosso
Cuyaba
Titicaca L.
Mt. Sorata
Mt. Illimani
Trinidad
Puno
Arequipa
Mollendo
La Paz
BOLIVIA
Cochabamba
Oruro
Santa Cruz
Goyaz
Matto Grosso
Diamantina
Serra Amores
Tacna
Sahama Vol.
Sucre
Ouro Preto

FIG. 340.

MAP QUESTIONS. — (1) In what zones does South America lie? (2) What would you expect the climate to be in the northern part? In the central part? In the southern part? (3) During what months does winter come in the extreme south? (4) What large rivers drain the continent? (5) Do you find any lakes? (6) To what extent is the coast line irregular? (7) Draw an outline map and locate upon it the mountains and rivers. Add the boundary lines of the principal countries. (8) Are there many islands? Where are most of them? (9) Find Cape Horn. It is south of what island? What strait separates this island from the mainland? (10) Which country has most railways? What does this indicate about the people? (11) In what zone is that country? How may the climate have influenced the building of railways?

FIG. 341.

Relief map of South America. In what portion are the highlands? Which are highest? Locate the lowlands.

Part III

SOUTH AMERICA

Physiography.— North and South America resemble each other in several respects. The former is triangular in shape and has its main highland masses on the two sides. What are their names?

Fig. 342.

A view in one of the higher valleys of the lofty Andes.

The western mountains are the younger and loftier, and they have many volcanic cones. They occupy a great breadth of country, the westernmost, or Coast Ranges, rising from the very shores of the

Pacific. Between the extensive highlands on the two sides of the continent are low plains stretching from the Gulf of Mexico to the Arctic Ocean.

South America is likewise triangular in shape, broad at the north and tapering toward the south, and its principal highlands are on the two sides (Fig. 341). Those on the west, the *Andes* (Fig. 342), form one of the loftiest mountain systems in the world, and between the ranges are included deep valleys and lofty plateaus. Throughout the entire length of the continent these mountains, rising from the very seacoast, extend inland for a distance of many miles. Many of the highest peaks are volcanic cones, one of them, Aconcagua, in Chile, reaching an elevation of nearly twenty-three thousand feet.

On the eastern side of South America the most extensive highlands are those in eastern Brazil (Fig. 341). This region, like New England, consists of ancient rocks, rising in the form of high hills and low mountains. The highest point is a little over ten thousand feet. The Guiana highland (Fig. 341), between the Amazon and Orinoco rivers, resembles the upland of Brazil and may be considered a part of it, although separated from it by the Amazon lowland. The remainder of the continent is lowland (Fig. 341) and mainly a vast plain extending from southern Argentina to the Caribbean Sea.

In South America, as in North America, the growth of mountains has raised the two sides of the continent and left a depression into which the sea once entered. But waste from the mountains, washed down by rain and rivers, has filled this depression and built the broad plains that are now there. By uplift these plains have been elevated to form dry land.

In two important respects North and South America are unlike in physiography. In the first place, their large rivers flow in different directions. Describe from memory the three or four principal river systems of North America. (Or see Fig. 44.) Make a sketch of the three largest rivers of South America. One of these is the largest in the world. Which is it? Which one most nearly corresponds to the Mississippi in position and direction of flow?

A second difference between the two continents is in regard to their coast lines. It will be remembered that much of the North American coast has been made irregular by the sinking of the land.

Much of the South American coast, on the other hand, has been rising. In the former case, many fine harbors were formed ; in the latter, the coast line is made straight because the level sea bottom is being raised. Notice how very regular is most of the western coast of South America. It is the most regular coast line of long extent in the world ; for a distance of three thousand miles there is a general absence of good natural harbors. What effect must this have upon the development of the continent ?

Climate. — A large portion of South America lies in the tropical zone and consequently has a hot climate. Where does the Tropic

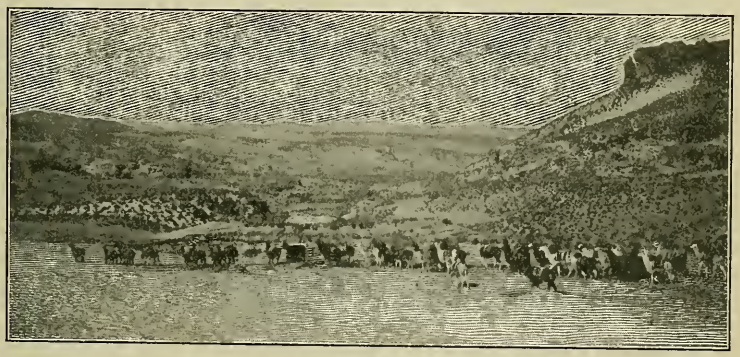


FIG. 343.
A view on the arid plateau of Bolivia — a train of alpacas is crossing here.

of Capricorn cross the continent ? The portion south of this tropic reaches into the south temperate zone, and its climate, therefore, resembles that of the United States. What countries of South America are partly or wholly in the temperate zone ? During what months do they have summer ? What effect on temperature are their north winds likely to have ?

The winds, together with the highlands, are the key to the rainfall. On the map (Fig. 294) it is seen that the belt of calms extends across the continent in the neighborhood of the equator. North of this belt the northeast trade winds blow (Fig. 294), while south of it is the zone of southeast trade winds. Still farther south are the horse latitudes, and then come the prevailing westerlies (Fig. 294), which blow across the southern end of the continent.

We may therefore expect heavy rainfall in the vicinity of the equator (Fig. 298), where the air is constantly rising. The northern coast must also receive abundant rains because the trade winds come from the ocean and are forced to rise in passing over the slopes. The highlands in eastern Brazil must likewise be well watered by the vapor-laden southeast trades (Fig. 298). Of course, these winds lose much of their moisture in travelling across the continent, but on approaching the Andes they are forced to a still greater height; accordingly, the eastern side of these ranges is wet by frequent rains.

South of the belt of calms, both in the trade-wind and horse-latitude belts, the western slopes and the valleys of the Andes (Fig. 298) are far too arid for agriculture without irrigation. In this region large areas are veritable deserts. This arid condition is due to the influence of the mountains, which interfere with the trade winds so that the prevailing winds are from the south, and therefore parallel to the coast (Fig. 296). Since these winds are blowing *toward* the equator, and therefore becoming steadily warmer, they do not give up their moisture and form rain. Thus there are deserts on the very coast.

Farther south the influence of the prevailing westerlies is felt. In this part of the continent, therefore, it is the *western* side that receives the rain, while the eastern part is dry (Fig. 297). In rising over the land these winds cause abundant rainfall in southern Chile; but, being robbed of their vapor as they cross the mountains, they descend as dry winds upon the plains of Patagonia. With what portion of the United States may the climate of this region be compared?

From the above we see that while most of South America is well supplied with rain, two extensive areas on opposite sides of the Andes are arid. Locate them (Fig. 297).

The heavy rain in the tropical section of the continent supplies the three great rivers with an abundance of water, and encourages a rank growth of tropical vegetation. But each year, as the season changes, the belts of rainfall migrate northward and southward (Figs. 202 and 203). Therefore on each side of the equator is a belt where the rainfall varies

with the season, being dry at one time of year and well watered in the opposite season. In the rainy season the rivers are flooded, and vegetation grows profusely; but with the dry season the streams shrink in size, and the plains become dry and parched. It is because of this dry period that there are open *savannas* both north and south of the equatorial forest (p. 291). They are called *llanos* in the Orinoco valley, *campos* in Brazil, and *pampas* in Argentina. Here trees cannot survive the drought; but grass is able to mature its seeds during the rainy season, then die down to the ground and remain dormant until the next period of rains.

Plant and Animal Life. — In the warm, rainy belt the great humidity and high temperature are favorable to an extraordinary

Fig. 344.

Tropical vegetation in the damp lowlands of Ecuador, where there are heavy equatorial rains. The boats are dugouts, that is, logs hollowed out in boat form by the natives.

growth of plant life (p. 289). So dense are the vast jungles of the Amazon that travel through them is almost impossible (p. 314); in fact, much of this forest wilderness has never been explored.

In the desert of the west coast, on the other hand, plant life is very scanty (Fig. 343). There are some parts, for instance the desert of Atacama in northern Chile, where, as in other desert sections of the world, there is almost no life of any kind.

In those sections where the climate is cool and the rainfall moderate, as on the mountain slopes and in the south temperate zone, the

land is forest covered. The extreme southern part of the continent has a climate so cold (Fig. 108) that the plants become dwarfed, as is the case near the tree line in northern Canada.

In the tropical forest there is a great variety of tree-dwelling animals, among which are many insects and beautiful birds. Among the larger animals may be mentioned the fruit-eating monkey, the fierce jaguar (Fig. 339), which preys upon other animals, and the sloth (Fig. 339), a creature which even sleeps suspended, back downward, from the branches of the trees. There are also many reptiles, including serpents and the iguana (Fig. 339), a tree lizard often several feet in length. Some of the serpents are small and poisonous; others, like the boa constrictor (Fig. 339), are large and powerful enough to crush a deer in their coils. The boa, coiled among the trees awaiting its prey, resembles a vine.

The beautiful butterflies and ants are most noticeable among the insects. Among the most interesting insects are the termites, commonly called white ants, which live in colonies, and build houses of earth. With so many insects there are naturally numerous species of insect eaters. One of the most interesting of these is the ant-eater (Fig. 339), whose long claws are adapted to digging the ants from their earthy or woody dwelling places, while its sharp-pointed snout and long tongue aid it in finding and devouring its food.

Besides these animals there is the tapir (Fig. 339), five or six feet in length, which wanders about at night, feeding along the watercourses; and the armadillo (Fig. 339), a burrowing animal protected by an armor. When attacked by an enemy, the armadillo rolls itself into a ball, enclosing its soft under parts. In the river waters and swamps are fishes, turtles, and alligators (Fig. 339). The turtle eggs and fish are among the principal foods for the forest Indians. Here also is found the manatee (Fig. 339), or sea cow, a mammal that has become adapted to life in the water. It lives both in fresh and salt water and ascends the Amazon even as far as Ecuador.

On the open plains, herds of deer roam about, and also the rhea (Fig. 339), — often called the American ostrich, — one of the few large running birds. It lives on the open plains, as in Patagonia, where are also found herds of guanaco, a kind of wild llama.

Among the crags and peaks of the Andes dwells the condor (Fig. 339), the largest of the flying birds — so large that it kills and carries off small deer. In the mountain valleys live the llama (Fig. 339) and its allies, the vicuna and alpaca, both wild and domesticated (Figs. 343 and 361). Like other mountain dwellers the llama is sure-footed on the rocks, and is thus

of great use as a beast of burden; and the cold climate causes it to have a thick coat of wool which is of value to man. Because of its usefulness the llama is sometimes called the American camel.

The People. — When South America was discovered by Columbus, it was inhabited solely by red men. Of these many were typical savages; and even at the present day some of the forest Indians are savages, living solely upon fish, game, and the abundant fruits. It is still unsafe for white men to go among them, and indeed there are forest tribes which still practise cannibalism (Fig. 345).

FIG. 345.
A cannibal girl from the tropical forest of Peru.

Along the coast and some of the larger rivers the red men found by the early explorers were more advanced. Like most of the North American Indians, they were in the lower stages of barbarism. In a crude way they cultivated the soil and manufactured a few simple implements. Many Indians in the more remote districts still live in this primitive way, though large numbers have mixed with the white settlers and adopted their customs.

But among the Andes, especially in Peru, Bolivia, and Ecuador, the Spanish explorers found tribes of Indians, under control of the Incas, who had developed far beyond their neighbors. Indeed, like the Pueblo and Aztec Indians of North America (p. 27), they had reached the early stages of civilization. The temperate climate of their mountain valley homes favored advance. And the protection from the inroads of their more savage neighbors, which the arid country and mountain barriers offered, gave them the opportunity to develop arts and to advance in other ways.

The Spanish, encouraged by the discovery of rich deposits of gold and silver, seized almost all of South America excepting Brazil, which was settled by the Portuguese. They treated the aborigines

with great cruelty, especially the Incas, whom they robbed of their treasures and reduced to slavery. As in North America, the Spaniards intermarried freely with the Indians, so that the present inhabitants of South America are to a large extent of mixed blood. The introduction of negro slaves has led to a still greater mixture of peoples. Therefore, while there are still pure-blooded Indians and negroes, and also pure-blooded white men, especially Spanish and Portuguese, the greater number of the South Americans are a mixture

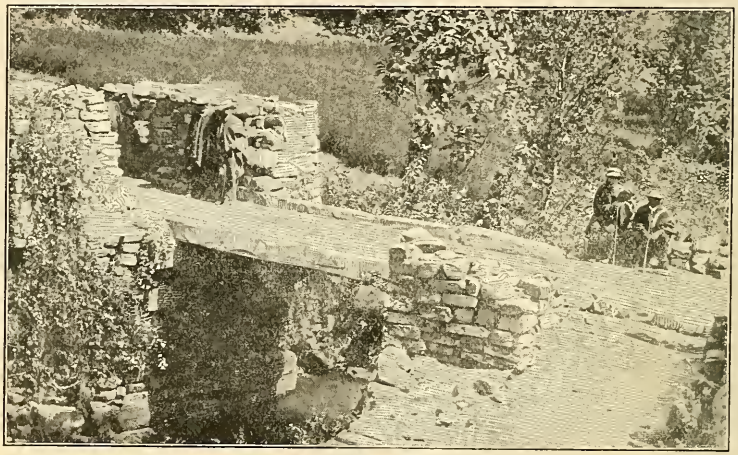


Fig. 346.

A bridge made by the Incas.

of two or more of these very different races. This fact is one of the main reasons for the unstable governments of some of the South American countries.

Spain maintained her control in South America for fully three hundred years. But in the early part of the nineteenth century the colonies revolted and established themselves as independent republics, modelled after the United States. They were led to fight for their independence partly because of the success of our own Revolution, but chiefly because of oppression by the Spaniards, who treated their colonies merely as sources of wealth.

Brazil also became independent of Portugal, and, after being for

a long time ruled by an emperor, established a republican form of government in 1889. Of late there have been many immigrants from European countries, especially from Germany and southern Europe. Special inducements have been offered to such colonists, and the recent development in portions of South America, particularly of Argentina and southern Brazil, has been partly due to these immigrants.

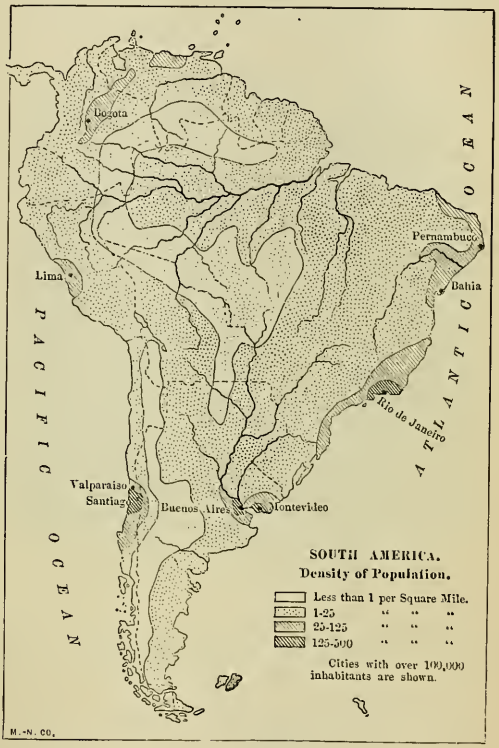


FIG. 347.

BRAZIL

Physiography and Climate. — This is the largest country in South America. It is even larger than the United States without Alaska, and nearly as large as Europe. While reaching north of the equator on one side, it extends into the south temperate zone on the other side. How many degrees of latitude does it include? Since so large a part of Brazil is in the torrid zone and on the eastern slope of the continent, its climate is not only warm but moist. Why the latter?

Eastern Brazil is a highland of ancient mountains worn down to the condition of hills and low mountains. Numerous streams drain this upland in various directions. Point out some of these (Fig. 340). Trace the divide between those flowing into the Amazon and Parana and those flowing into the Atlantic. What is the name of the largest river emptying directly into the Atlantic?

The northern third of Brazil is mainly a vast level plain, throughout most of its extent occupied by dense forest and drained by the Amazon. What is the condition on the campos? Why? (p. 293). The rainfall in the Amazon valley is so heavy and the slope of the land so gentle, that the Amazon and its larger tributaries are swollen to great breadth. At times of flood the rivers overflow the surrounding country and transform it to an immense swamp through which many branching channels extend. In places the Amazon is several miles in width, and resembles a great lake rather than a river. Boats are able to pass up the river nearly to the base of the Andes, a distance of twenty-two hundred miles from the seacoast. Some of the tributaries are also navigable.

FIG. 348.

Some of the Indians of tropical South America. Notice the nose and lip ornaments.

Along the route of navigation there are settlements, such as MANAOS, which is reached by ocean steamers; but at a distance from the river there is nothing but an almost unknown wilderness (Fig. 347).

The Tropical Forest. (Also pp. 289 and 310.) — The Amazon forest offers a typical illustration of the tropical forest (Fig. 323) where plants, encouraged by the uniformly high temperature and great dampness, grow luxuriantly in the rich soil. Not only is the rainfall heavy, but evaporation is retarded by the dense vegetation, so that the forest is reeking with moisture. Consequently at night time, when the temperature falls, such heavy dews collect that the plants are wet by them as by a rain.

One of the features of such a forest is the dense gloom and the silence, broken now and then by the crash of a falling tree, or the sorrowful notes of birds, or the frightful howling of monkeys, or perchance the shrill

scream of an animal which has fallen prey to the boa (Fig. 339). Why might we expect the animals in large part to be tree dwellers?

To one whose home is in the temperate zone the tropical forest appears very strange, for the woods are much the same throughout the year. There is no time when all the trees send forth their leaves and blossoms; nor is there a time when all the leaves change and fall to the ground. Some of the trees blossom throughout the year; others have their blossoms at regular seasons; thus flowers and fruit may be seen at all times of the year.

Products of the Forest. — Among the trees of the tropical forest are many useful kinds. Some produce gums, such as *caoutchouc*, from which rubber is made; or edible fruits and nuts, or valuable timber and dyewoods. In fact, the name *Brazil* is derived from a word applied to a dyewood found in the Amazon forests.

Fig. 349.
An Indian hut on the Amazon.

Many of the inhabitants near the rivers, who have partially adopted the customs of civilization, make long journeys into the forest to collect the products, both for their own use and for shipment down the Amazon. But the difficulties of travel, and the warmth and dampness of the climate, are opposed to much work. Therefore the resources of this part of Brazil are only partially developed.

The natives still cultivate the *mandioca*, which was one of their principal sources of food when white men appeared. This plant has beneath the soil an enlargement of the root which in shape resembles a long sweet potato. A dish of dry meal, or *farina*, made from the mandioca is commonly seen on Brazilian tables, and it is often stewed with beans. Mandioca bears much the same relation to these people that wheat bears to those who live in temperate climates. It is from this plant that *tapioca* is made.

The Indians are also engaged in obtaining *rubber*, a product of immense importance because of its many uses, for example, as a packing around the

valves of machinery, and as an insulator around wires and cables. Name other uses of rubber.

Coffee Raising. — The coffee tree is a native of Abyssinia in Africa. It was introduced into Brazil in the eighteenth century, and has proved so successful that Brazil now produces more than one-half of all the coffee raised in the world. Coffee is cultivated all the way from southern Brazil to the Amazon, and it is estimated that there are fully five hundred million coffee trees in Brazil alone.

FIG. 350.

A part of the city and harbor of Rio de Janeiro.

Coffee raising requires great care and expense. The plant must have a warm climate; it cannot stand extreme heat or frost. The soil must be fertile, and the plant must be protected from winds. It grows best at altitudes of from fifteen hundred to forty-five hundred feet.

The small white flower grows in clusters, and the fruit, which is also clustered, looks somewhat like a medium-sized cherry. Inside of the husk are two kernels with the flat faces together. The berries are picked, dried in the sun, and hulled by machinery, the picking being done from April to September. After being sorted in the cities the coffee is shipped in bags. Formerly most of the Brazilian coffee left the port of RIO DE JANEIRO, but now more than half of it is sent from SANTOS. Coffee is the principal export of Brazil, and much of it comes to the United States.

Other Industries in Brazil. — On the highlands of Brazil, where coffee raising is carried on, other crops are also produced, such as cotton, sugar, tobacco, fruit, and corn. Much cocoa is cultivated in the tropical section, and in the extreme south many cattle are raised. The rocks of the highlands have produced some valuable minerals, especially gold and diamonds. Indeed, at one time, the southern part of Brazil was the principal diamond-producing region in the world. Both coal and iron are also present, though they are not yet extensively mined.

Cities. — The capital and largest city of the republic is RIO DE JANEIRO, a city about as large as Boston, and the second in size in South America. It is situated upon a fine harbor (Fig. 350) and is surrounded by excellent farming country and coffee plantations. Several other Brazilian cities are seaports connected with the interior by short railway lines which bring the coffee and other products for shipment. The most important are BAHIA, SANTOS the seaport of SÃO PAULO, and PERNAMBUCO, the chief port for the export of sugar and cotton. Compare the size of each of these with some city in the United States (Tables in Appendix). On the Para River, near the mouth of the Amazon, and connected with it by a branch of the river, is PARA, from which most of the rubber, vanilla, and other products from the Amazon forest are shipped to America and Europe.

ARGENTINA

Physiography and Climate. — This is by far the most advanced of South American countries, and the reasons are not difficult to understand. In the first place, Argentina extends from just within the torrid zone to the extreme southern end of South America. Thus the country is for the most part within the temperate zone, whose climate is favorable to the development of energetic people. Also the *range* of climate, from arid to rainy (Fig. 297) and from tropical to temperate, insures a considerable range of products. A second reason for rapid advancement is the fact that, while there are mountains in the west, the remainder of the country is largely one vast expanse of *pampas* (Fig. 351). These open, treeless plains

have made it easy for settlers to move about and to carry on the industries of farming and ranching. This is quite in contrast to the unfavorable conditions in the Amazon valley; but it may be compared with the ease of settlement which the plains and prairies of the United States have afforded.

Such favorable conditions have served to attract many immigrants from Europe, and there is, therefore, a larger percentage of pure-blooded whites here than in other parts of South America.

Fig. 351.
On the pampas of Argentina.

Largely for this reason the government of Argentina is decidedly better than that in most South American countries.

Cattle Raising. — The open plains are well adapted to ranching, and it is estimated that there are nearly 100,000,000 sheep and 25,000,000 cattle in this country. Stock raising in Argentina differs in some respects from ranching in the United States (pp. 128 and 163).

Formerly the herds roamed over the plains, feeding on government land, as is the custom in the United States. The government of Argentina, however, recognizing that ranching would be more successful if the cattle owners controlled large bodies of land, has been in the habit of selling large tracts to the ranchmen, who after purchase fence in their land. In western United States, on the other hand, ranchmen cannot obtain large tracts of government land because of the laws which restrict its sale to small blocks. But some of our western land, owned by the railways, can be bought in large tracts, and there the custom is growing to purchase and fence land, introduce better stock, and care for it, as in Argentina.

Farming. — The climate and soil in many parts of Argentina are favorable to agriculture. In the warm northern portion sugar-cane, coffee, and tobacco are produced; in the more temperate part, where the rainfall is sufficient, grains and alfalfa are raised. There is also much fruit raising, especially grapes, from which wine and raisins are made.

Wheat is the most important agricultural product, the value of the crop being fully $50,000,000 a year, making the Argentine plains one of the great wheat-producing sections of the world. The climate is favorable, the soil fertile, and the land level or gently rolling, as in Minnesota and the Dakotas. Agriculture in the extreme south is prohibited by the cold; but sheep raising is carried on even in Patagonia and on the stormy islands beyond the Straits of Magellan.

Manufacturing and Commerce. — Besides the industries mentioned above, there is some lumbering and mining in the mountainous portion. But although the words *Argentina* and *Plata* mean silver, their use as proper names comes from the fact that the natives wore silver ornaments, rather than from any abundance of the white metal in Argentina.

In the large cities there is considerable manufacturing, largely connected with the raw products of the country, as, for instance, dairying, woollen mills, flour, sugar, wine, and cotton manufacturing, the preparation of hides, etc. Nevertheless, a large part of the raw products is sent abroad, particularly wool, sheepskins, hides, wheat, corn, and meat. On the other hand, machinery, cloth, and other manufactured articles must be imported.

With such a development of the resources it is natural that there should be means of ready transportation. The broad Parana River, which empties into the Plata estuary, offers extensive water connection with the interior; and railways ramify the well-settled portions of the country, connecting all the important cities. In fact, because of the superior development of Argentina, there are more railways here than in any other South American country. In resources, industrial development, government, and educational system Argentina, of all the South American countries, bears the closest resemblance to the United States.

Cities. — By far the most important city is BUENOS AIRES, which is the largest city in South America, and considerably larger than St. Louis in the United States. There is a certain resemblance between Buenos Aires and New York, the metropolis of North America.

Each is situated on a good harbor on an estuary, and each has water connection with a very productive interior having a temperate climate. Moreover, from various parts of the interior, in each case, railway lines converge toward the seaport, while steamship lines extend to all quarters of the globe. New York, however, is a gateway to a much larger and more varied country, and one of greater resources. In addition, New York has been developed for a longer time. Consequently it is much larger than Buenos Aires.

Buenos Aires is a busy and rapidly growing city with much manufacturing, especially flour milling, brewing, and the canning and preserving of meat. It also has an extensive commerce. Just below the city, on the Plata estuary, is the seaport of LA PLATA; and upstream, on the Parana, is the rapidly growing city of ROSARIO, which is an important railway centre as well as a river port. In the interior are a number of towns and cities, among which the railway centre CORDOBA is the largest.

URUGUAY AND PARAGUAY

Uruguay. — Like so much of Argentina this is a region of plains, well watered and excellently adapted to agriculture. Naturally, therefore, cattle and sheep raising are important industries. But although the climate and soil are favorable to the same crops that thrive in northern Argentina, there has been little progress in agriculture. Indeed, quite in contrast to its neighbor Argentina, this country is but slightly developed. The government is very bad indeed, for a few men control the army and make and unmake presidents almost at will.

The principal products of Uruguay are those connected with cattle and sheep; namely, dried beef, corned beef, ox tongues, hides, tallow, horns, sheepskins, and wool. The famous Liebig extract of beef is made in this country. The company disposes of more than one thousand cattle a day during the summer months, and exports tongues, canned meats, beef extracts, and other products, to the value of $15,000,000 a year.

The capital and largest city is the seaport of MONTEVIDEO, situated at one end of a semicircular bay on the Plata estuary.

Paraguay. — Like Bolivia this little country is without a seacoast, though it has access to the sea by way of the Parana River. It is a region of hills and plains covered with forests in part, but with many tracts of pasture land upon which large herds of cattle feed. The climate is hot and dry, with most of the hot winds from the north. Fortunately most of the rain falls during the hot summer, when the ocean winds blow toward the heated land.

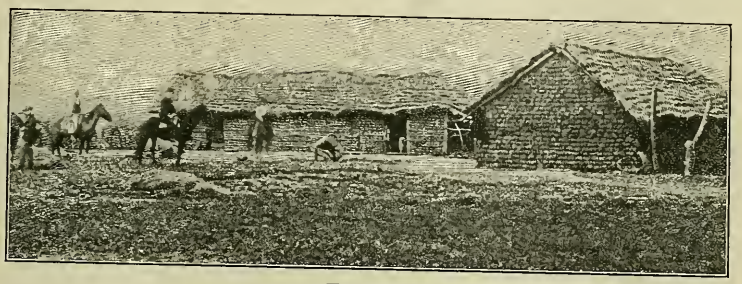


FIG. 352.
Ranch houses on the plains of Uruguay.

The agricultural products are those of the warm temperate and tropical zones, including tobacco, rice, sugar-cane, and oranges, while from the forests rubber, dyewoods, and valuable timber are obtained. There is but one railway which connects the capital, ASUNCION, with Montevideo on the sea.

A peculiar product, and the principal export of this country, is *yerba matè*, or *Paraguay tea*. Although not used as extensively as our tea, which comes mainly from China and Japan, it is very popular in South America, where its use was learned from the red men.

THE GUIANAS AND VENEZUELA

The Guianas. — North of Brazil are three small countries, the only portions of the South American continent now under control of European nations. They belong to Great Britain, Holland, and France, respectively, and are known as *British Guiana*, *French Guiana*, and *Dutch Guiana*, or *Surinam*. Find the capital of each.

Gold is obtained in each of the Guianas, although the development in this direction has gone little farther than the washing of gravels.

In these small countries a large part of the surface is still a forest wilderness inhabited chiefly by Indians who have little contact with white men. This tropical forest, like that of the Amazon, which it closely resembles, supplies rubber and valuable timber ; but its resources are only slightly developed. Near the coast, however, there is a strip of cultivated land from which is obtained sugar-cane, bananas, cotton, and a few other products. Of late, especially in

FIG. 353.

A cocoanut grove on the northern coast of South America.

Dutch Guiana, attention has been turned to the production of cocoa and coffee.

The Guianas are so slightly developed that there is but one short railway, and in most sections there are almost no roads. There are practically no exports except sugar, molasses, and rum — all made from sugar-cane. Flour, clothing, and other manufactured articles are imported.

Venezuela.[1] — This country includes one of the spurs of the Andes and also a portion of the Guiana highland. But a large part of Venezuela is occupied by the broad plains of the Orinoco valley. Some of these plains, the treeless *llanos* (p. 309), are the seat of extensive cattle raising, as in the case of the pampas of

[1] This name, which means "little Venice," was applied to the country because when first visited in 1499, white men found an Indian village built on piles or posts in the water along the shores of Lake Maracaibo.

Argentina. In parts of Venezuela, are vast forests which produce valuable dyewoods and rubber. Among the mountains also are found rich mineral deposits, especially gold.

There is some agriculture. Hardy crops, like potatoes, beans, and barley, are raised even at altitudes of eight thousand feet; but below five thousand feet are found such semi-tropical and tropical products as sugar-cane, bananas, cocoa, and coffee. The latter is

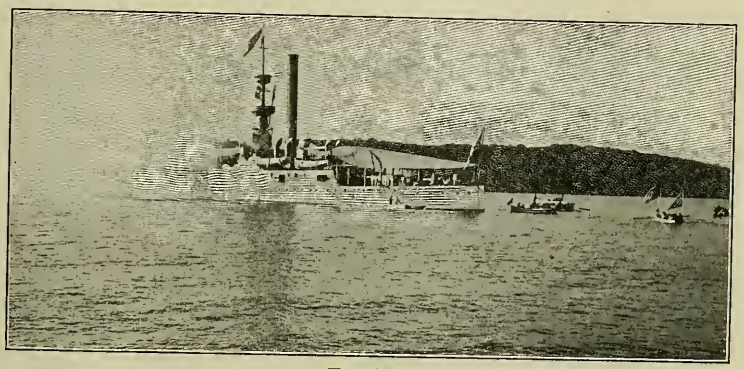


FIG. 354.

The lower Orinoco. Notice how broad it is and how deep it must be to float the large United States cruiser. Yet this picture is taken at Ciudad Bolivar, far up the river. Find it on the map, Fig. 340.

the chief export; in fact, Venezuela is one of the leading coffee-producing sections of South America.

The capital, CARACAS, five or six miles from the sea, is situated upon a highland over three thousand feet above sea level. It is connected with its ports by a short railway line which winds about in its descent to the sea.

In 1812 Caracas was visited by one of the most terrible earthquakes ever recorded. Being Ascension Day, a great part of the population was at church. The first shock caused the bell to toll, but after all danger was thought past, there came a terrible subterranean noise, resembling the rolling of thunder, but louder and longer. Then came a shaking of the earth so tremendous that churches and houses were overthrown and the inhabitants buried beneath their ruins. On that day fully twelve thousand persons perished. People were told that it was sent as a punishment for revolting from the rule of Spain.

Tropical Andean Countries

Points of Resemblance. — These countries, Columbia, Ecuador, Peru, and Bolivia, are all crossed by the lofty Andes and are therefore mountainous. Each of them extends eastward beyond the mountains, to the plains of the upper Amazon and Orinoco valleys. In Columbia these plains include a portion of the llanos. Why

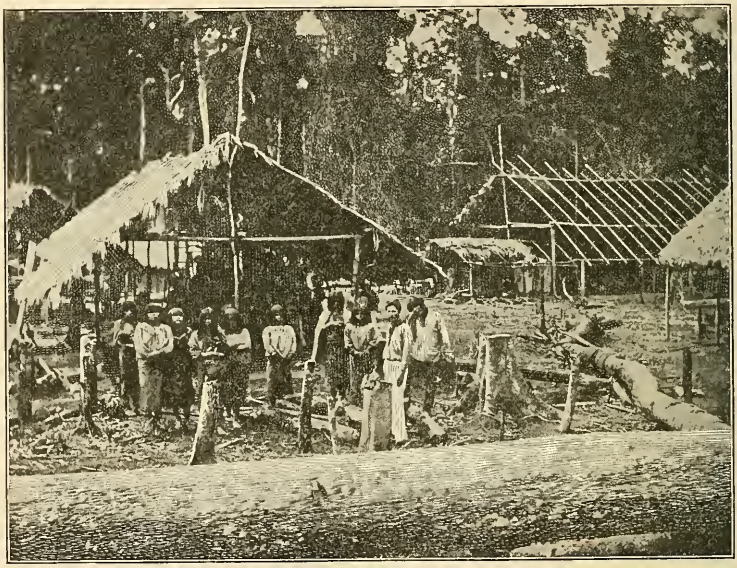


Fig. 355.

Building houses in a clearing in the forest of Peru on the eastern side of the Andes.

then are they treeless? (p. 291.) Elsewhere the plains are covered with a dense tropical forest (Figs. 323 and 355), resembling that of the Amazon in density of plant growth and in human inhabitants. What can you tell about it then?

There is, of course, great variety of climate in this section. Tropical heat prevails throughout the lowlands (Fig. 344); but the heavy rainfall near the equator contrasts strikingly with the arid conditions of southern Peru and northern Chile, which lie in the belt of southeast trades (p. 308).

The elevation due to mountains and plateaus also causes differences in climate. This may be illustrated by the vegetation. Up to an altitude of three thousand to four thousand feet, bananas, sugar-cane, cocoa, and other plants of hot climates flourish. Above this, to an elevation of six or seven thousand feet, the cooler climate permits the growth of tobacco, corn, and coffee. From this height up to about ten thousand feet, wheat and our northern vegetables and fruits do well; but above ten thousand feet the bleak mountain peaks are too cold for farming. There is therefore a great variety of farm products in western South America.

The fact that this section is so mountainous furnishes an explanation of its importance in the production of minerals. Both gold and silver ores, and other minerals as well, are found from the northern to the southern limit of the Andes, and this is therefore one of the great mineral-producing regions of the world. It was the abundance of precious metals which attracted the Spanish to the continent.

Goaded by the Spanish misgovernment, these colonies revolted in the early part of the last century and established independent republics. But the nature of the population was such that *real* republican government was impossible. In each of the countries ambitious leaders, usually generals in the army, have again and again overturned the government after a revolution. This has seriously interfered with the development of industry and commerce; for not only have lives and property been lost, but a feeling of uncertainty has been introduced which has prevented settlers from coming, and capitalists from investing money for the development of the resources.

None of the capitals of the Andean countries are on the coast, and several are in the interior at a considerable elevation above sea level. In choosing such sites the Spaniards have had the example set them both by their Spanish ancestors and by the Incas; for Cuzco, the capital of the Incas, and Madrid, the Spanish capital, are both at a considerable elevation above sea level and many miles from the coast. The principal objects in the selection of these sites are to be near the mines, to secure a cooler and more healthful climate, and to obtain protection from attack by sea.

Doubtless another reason why these cities are not on the coast is the absence of good harbors. Throughout almost its entire extent, except in

the cold southern portion of Chile, the coast is wonderfully straight. Why? (p. 307). Even in the present century the coast has risen several feet in a part of Peru and Chile. This uplift occurred during earthquake shocks, and it was, without question, the slipping of the rocks that caused the shocks.

Colombia. — This country, named after Columbus, includes the Isthmus of Panama, and therefore has seacoast on both oceans. It is of especial importance to us, since the great Panama ship canal is being constructed across the narrowest part of the Isthmus. Of what advantage will such a canal be to the United States? What two cities are located at the ends of this canal route? A railway connects these two cities, and many goods are carried over it; for vessels approach from one side and unload and transfer their cargoes to the other ocean, where other vessels await. Thus the long voyage around South America may be saved.

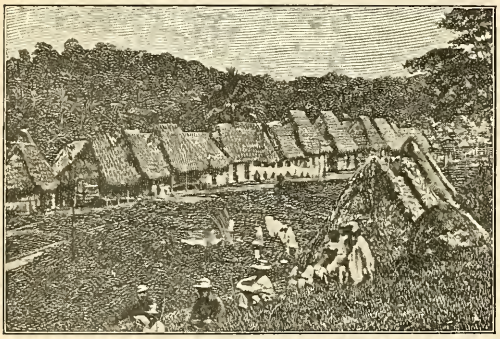


FIG. 356.
A native village in Colombia on the Panama Railway.

It is in Colombia that several of the Andean ranges terminate, so that the western part of the country is very mountainous. Here there is much mineral wealth, gold and silver being of most importance, though emeralds of excellent grade are also obtained. In the eastern portion of the country, on the other hand, are treeless llanos on which large numbers of cattle are raised, as in Venezuela. Coffee is the principal agricultural product and the chief export; but sugar-cane, tobacco, and cocoa are also produced. On the mountain slopes the grains, fruits, and vegetables of temperate climates are grown.

BOGOTA, the capital and largest city, is situated far in the interior and at an elevation of about a mile and a half above sea level. It has an agreeable climate, even though within the tropics.

Ecuador. — Why should this name, the Spanish for equator, be applied to this country? In the Andes of Ecuador there are many volcanoes, including Cotopaxi, the loftiest active volcano in the world, and Chimborazo, which is still higher but no longer active.

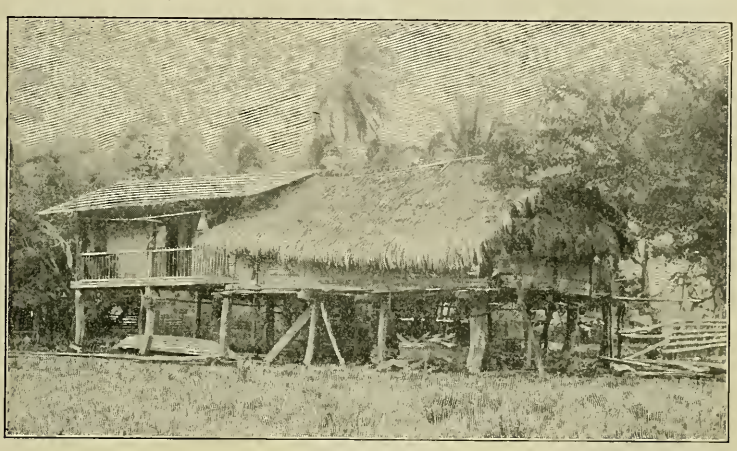


FIG. 357.

A native house in Ecuador. Can you suggest reasons for building it on posts rather than on the ground?

Naturally, because of its position, this country has a hot, damp climate near sea level, but is much more temperate on the mountain slopes. The principal occupations are cattle raising and farming. The chief farm products are wheat and barley on the highlands, and coffee, sugar-cane, and *cocoa* on the warm lowlands. The last named is the most important product of Ecuador, and fully one-fifth of all the cocoa produced in the world comes from there.

Another product of Ecuador, and of some other South American countries, is *sarsaparilla.* The rubber industry is also well developed; and, now that the accessible supply from wild trees is becoming exhausted, attention is being given to the planting of rubber trees.

Even in the cities there is practically no manufacturing. One of the reasons for this is the almost total absence of roads, making the transportation of heavy machinery very difficult. This fact also interferes greatly with mining operations among the mountains. Therefore, although there is much gold and silver, mining is as yet slightly developed.

Quito, the capital of Ecuador, is situated among the mountains of the interior at an elevation of about nine thousand feet. But the largest city is the seaport Guayaquil, the westernmost of the large cities of South America. It is in W. Long. 80°. Does it lie to the east or west of Washington?

Fig. 358.
A Peruvian Indian.

Peru. — The broad, forest-covered plains on the eastern side of the rugged Andes are drained by some of the larger headwaters of the Amazon, and thus Peru is provided with water communication to the Atlantic. While much of this dense tropical forest is an almost unexplored wilderness, the mountain valleys are settled mainly by the descendants of the Incas.

In Peru there are not only variations in climate due to altitude, as in Ecuador and Colombia, but also great differences in rainfall. The heavy fall of rain on the eastern side of the Andes offers a striking contrast to the arid and even desert climate along their western slopes (Fig. 297). State the cause of this aridity once more (p. 308). So little rain falls in southwestern Peru that in some parts, even close by the sea, there is an average of but one shower in seven years.

Peru was one of the most valuable sources of gold and silver for the Spanish conquerors. The Incas who dwelt there had accumulated gold for ornament, and this the Spaniards seized. Then, opening mines, they forced the Indians to work as slaves. Since that time vast quantities of gold and silver have been obtained in that country, and valuable deposits of gold, petroleum, and copper have also been found.

There is much agriculture in Peru, the principal crops being corn, wheat, and potatoes among the mountains, and sugar-cane, cotton, tobacco, and coffee in the lower warmer sections. Even in the arid portion there is some farming; for, as in southern California, the rains and snows of the mountains supply water for irrigation in the valleys and on the narrow coastal plains. Thus, even in the desert, there are some gardens, vineyards, and fields of cotton and sugar-cane.

Chinchona, or *Peruvian bark*, from which the valuable medicine *quinine* is obtained, was known to the Incas and is still an important Peruvian

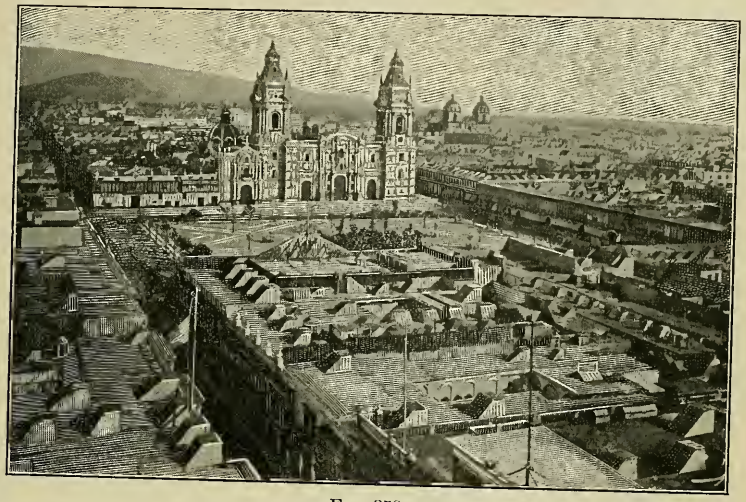


FIG. 359.
A view of Lima, the capital of Peru.

product. It is obtained from an evergreen tree whose leaves resemble those of the laurel.

Before the year 1879 Peru was making rapid progress; but by a war with Chile at that time the nation became almost paralyzed. Although there is some manufacturing, especially connected with sugar production, most manufactured articles must be imported.

LIMA, the capital (Fig. 359), founded by the Spanish conquerors in 1535, is situated at the base of the Andes. CALLAO, the seaport of Lima, is about seven miles from the capital. Its harbor is but little more than an open roadstead partially protected by an island on the southwest side. However, since the winds and ocean swells are from the south, while the coast is practically never visited by storms, this slight protection is sufficient.

AREQUIPA, at an elevation of seven thousand feet, is separated from the sea by sixty miles of desert. CUZCO, the old Inca capital, is on an interior table-land, at an elevation of over eleven thousand feet. The ruins

of the Inca citadels and "palaces" are still to be seen, and many pure-blooded and half-breed Incas still dwell in and near the city.

Bolivia.— This country, named after General Bolivar, the great South American leader in the revolt against Spain, was robbed of its seacoast by Chile. What other South American country has no seacoast? In a broad valley between the mountains is Lake Titicaca (Fig. 360), partly in Peru and partly in Bolivia. This lake, the greatest in South America, is almost as large as Lake Erie; and its elevation, twelve thousand five hundred feet above the sea, makes it the most elevated great lake in the world.

FIG. 360.

An Indian boy in a rush boat on Lake Titicaca. The fact that rushes are still used in making boats shows how these people cling to ancient customs.

The Incas occupied this region also, and mined much gold. Besides gold the Spanish have found veins of copper, tin, and silver, so that mining has been one of the most important industries of the country. It is said that over three billion dollars' worth of silver has been secured since the Spanish discovery. Bolivia is also one of the great tin-producing countries of the world.

The mining and reduction of the ore are done by very crude methods. For example, instead of using costly machines for crushing the ore, as in the United States, one method is to roll boulders around on the ore Since there are practically no railways, goods are transported for the most part by trains of pack-mules, donkeys, alpacas, or llamas (Figs. 343 and 361). The llama here, as in Peru, is of great value to the inhabitants, not merely as a beast of burden, but also as a source of wool for clothing.

Much of eastern Bolivia, like eastern Peru and the Amazon valley, is an almost unknown forest wilderness. But in the mountain valleys and on the plateaus agriculture is carried on, with products similar to those of Peru. Most of these are consumed at home, though some coffee is exported.

Better railways and the improvement of the rivers, so as to permit river transportation to the Atlantic, are among the greatest

FIG. 361.

A group of llamas in the Andes.

needs of the country. Through what rivers could boats pass to the sea? Find the capital of Bolivia. LA PAZ, the largest city, has twice as many inhabitants as the capital.

CHILE

Physiography and Climate. — Since the divide between the Atlantic and Pacific drainage forms the eastern boundary line of Chile, the country is very narrow in an east and west direction. It is also very mountainous (Fig. 362). Except in the south, the coast line is regular like that of the rest of South America.

The climate varies more than that of any other South American country. The northern part is within the torrid zone, while the southern end reaches far into the bleak south temperate zone (Fig. 363); and on the mountain slopes there is every climate from frigid[1] to torrid. Moreover, northern Chile is arid and in places an absolute desert; but central and southern Chile reach into the rainy belt of prevailing westerlies (Fig. 296). The best developed section lies in the middle part between the hot, arid north and the

[1] The name *Chile* is derived from an Indian word signifying snow.

bleak, rainy south. This part of Chile is bathed by a cold current from the south, which cools the air as the Labrador current chills that of New England (Fig. 318).

Mineral Wealth. — There is much mineral wealth, including lead, silver, coal, and copper. The latter is of such importance that Chile, like the United States, is one of the great copper-producing countries of the world. There are also beds of nitrate of soda

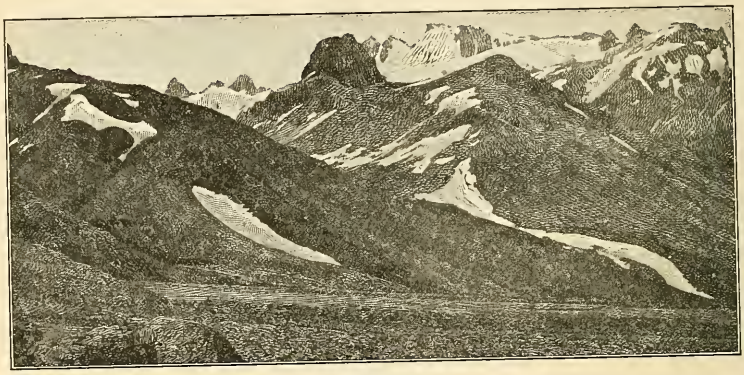


FIG. 362.

Snow-covered mountains of Chile.

which were captured during the war of 1879–80, and at present yield the government an annual income of fully $10,000,000. Nitrate is the principal export.

The nitrate beds occur in the midst of the desert of Atacama, in which rain almost never falls. The substance occurs in layers a few inches to one or two feet thick, over an area thirty or forty miles in breadth. In color it varies, according to the impurities contained. After being dug out, the pure nitrate is dissolved and separated from the impurities, and then sold. Its chief use is that of a fertilizer, for which purpose great quantities are shipped from the port of IQUIQUE.

Agriculture, Manufacturing, and General Development. — There is much agriculture in Chile, especially in the rainy middle portion. The principal crops are the various grains, tobacco, and vegetables, thus resembling agriculture in many parts of the United States. More wheat and barley are produced than are needed at home, so

that Chile helps to supply other nations with grain. Large herds of cattle are also reared, and sheep raising is one of the chief industries in southern Chile. Hides, shoe leather, and wool are exported. More manufacturing is carried on than in most South American countries, the principal kinds being flour milling, cheese making, tanning, and shoe manufacturing; but as elsewhere on that continent, machinery and many other manufactured articles are purchased in Europe and the United States.

Chile is one of the most progressive countries in South America. Its government is stable, and its industries are well developed. This

FIG. 363.

A view in the Strait of Magellan at the bleak southern end of Chile. Snow remains on these mountains throughout the year.

progress is doubtless in large part due to the temperate climate, which requires energy on the part of its inhabitants, and invites settlers from the temperate climate of Europe. It is interesting to note that the two most advanced nations of South America lie side by side in the temperate zone.

Cities. — The principal cities are SANTIAGO, the capital and largest city, situated inland, and VALPARAISO, its seaport. As at Callao (p. 329), the harbor of Valparaiso is open to the north; but the wind seldom blows from that quarter.

ISLANDS NEAR THE CONTINENT

The *Galapagos Islands,* about six hundred miles west of Ecuador on the equator, are a group of small volcanic islands owned by Ecuador. They are too far from the continent to show on our map.

Just east of the southern tip of South America are the *Falkland Islands,* which belong to Great Britain. Still farther east are the islands

of *South Georgia*, also British. Just off the coast of Venezuela, opposite the mouth of the Orinoco, is the low island of *Trinidad*, also a British possession. This island is especially noted for its extensive pitch lake, from which asphaltum is obtained for use in making asphalt pavements. The asphaltum oozes slowly from the ground, and, as it is dug out, more oozes forth, as if there were an inexhaustible supply beneath the surface.

West of Chile, and belonging to that country, is the island of *Juan Fernandez*. This is the island where Selkirk was wrecked, and by some is thought to be the island home of Robinson Crusoe. It seems quite certain, however, that Defoe described Tobago just north of Trinidad.

Review Questions. — (1) State some resemblances between South America and North America. (2) Describe the highland regions. (3) The lowlands. (4) In what respects do North and South America differ? (5) Tell about the differences in temperature in different parts of South America. (6) Explain the regions of heavy rainfall. (7) Where are the arid belts? Give the reasons. (8) What about the rainfall in the south? (9) Why does the rainfall vary with the season in the tropical belt? (10) What differences in the plant life are found in South America? Why? (11) Tell about the animals of the tropical forest. (12) Of the plains and mountains. (13) Describe the Indian life in the forest. (14) What can you tell about the Incas? (15) State the main facts in the history of South America since the whites came. (16) Describe the principal physiographic features of Brazil. (17) What are the variations in climate? (18) Tell about the influence of rainfall upon the vegetation and the rivers. (19) Describe the tropical forest of the Amazon. (20) What valuable products are found? (21) What can you tell about mandioca? (22) Tell about coffee raising. (23) What other products come from Brazil? (24) Name and locate the principal cities; what can you say about each? (25) Describe the physiography of Argentina. (26) What influence have the physiography and climate had upon development? (27) How does ranching in Argentina differ from that of the United States? Why? (28) What are the principal farm products? (29) Tell about manufacturing. (30) About commerce. (31) How does Argentina differ from many other South American countries? (32) Compare Buenos Aires with New York. (33) Locate the other cities named. (34) What are the industries of Uruguay? (35) Name the capital. (36) Compare Uruguay with Argentina. (37) What about the climate and products of Paraguay? (38) Name the three Guianas. (39) What are the conditions and products? (40) Describe the physiography of Venezuela. (41) What are the principal industries? (42) What can you tell about Caracas? (43) Name the Andean countries. (44) Tell about the climate, its variations, and influence on the farm products. (45) What about the minerals? (46) What was the influence of the Spaniards? (47) Give reasons for the locations of the capitals. (48) Of what importance is the Isthmus of Panama? (49) Describe the physiography and industries of Colombia. (50) What about the capital? (51) Tell about the effect of climate on the industries in Ecuador. (52) Name the products. (53) Why is there little mining and manufactur-

ing? (54) Locate the principal cities. (55) Tell about the physiography and climate of Peru. (56) About the minerals and agricultural products. (57) Locate and tell about the principal cities. (58) What about the large lake in Bolivia? (59) Tell about the mining. (60) The other industries. (61) The transportation of goods. (62) Describe the physiography of Chile. (63) The climate. (64) Name the mineral products. (65) What other industries are developed? (66) Why is Chile so progressive? (67) Locate the largest cities. (68) Locate the island groups mentioned.

Review and Comparison with North America. — (1) Which of the two Americas has the advantage in regard to latitude? Show how. (2) Tell about the effects of the trade winds in each continent (Fig 298). (3) Of the prevailing westerlies (Figs. 297 and 299). (4) Locate the arid sections in each continent, and give the reasons for the lack of rain (Figs. 296–299). (5) Point out the rainiest section in each, and state the causes. (6) Which of the two continents has the better position for world commerce? Why? (7) Into what ocean do the principal rivers of South America flow? Of North America? (8) What can you say about the regularity of the coast of the two grand divisions? Which has the advantage in this respect? How? (9) Locate the principal coast cities of South America. Of North America. Give the main advantages of the location in each case. (10) What about the number of lakes in each continent and their value for commerce? (11) What interior cities in each continent can you locate? (12) Compare both Brazil and Argentina with the United States in area; in population. (13) Compare Chile with Texas in these two respects. (14) What important farm products are common to South America and the United States? (15) Name some products that are extensively raised in one and not in the other. (16) Which parts of each continent are especially noted for cotton? Coffee? Wheat? Cattle and sheep? Copper? Precious metals? (17) What is the prevailing kind of government in North and in South America?

Suggestions. — (1) Give several reasons why South America has been much less rapidly settled than North America. (2) What parts of North America have been rising and on that account possess few good natural harbors? (3) How does the Spaniards' treatment of the Incas compare with their treatment of the North American Indians? (4) Find out some of the ways in which coffee is often adulterated. (5) Make a sand model of South America; a drawing. (6) If you were expecting to emigrate there, where would you prefer to settle? Why? (7) What products of South America are you probably seeing and using from week to week? (8) Is Brazil likely to rival the United States in importance in the future? Why? (9) What are the prevailing languages in South America? How has that come about? (10) How do you account for the similarity in the governments of North and South America? (11) Is it an advantage or a disadvantage for South America that it has so many more countries than North America?

FIG. 364.

What reasons can you suggest for the fact that certain parts (like central Spain, northern Russia and Scandinavia, and the country between the Black and Caspian seas) are not densely populated?

ARCTIC
ATLANTIC OCEAN
North Sea
Baltic Sea
London
English Channel
Paris
Seine R.
Rhine R.
Berlin
Vienna
Alps
Mt. Blanc
Rhone R.
Pyrenees
Appennines
Adriatic Sea
Rome
Strait of Gibraltar
Mediterranean Sea
AFRICA

FIG. 365.

O C E A N O
Dwina R.
Ural Mts.
St. Petersburg
A S I A
R.
Volga
Don R.
Dnieper R.
Caspian Sea
Caucasus Mts.
Black Sea
Constantinople
RELIEF MAP
OF
EUROPE
Scale of Miles
0 100 200 300 400 500 600

FIG. 366.

Coal map of Europe.

FIG. 367.

The ice sheet of Europe.

Part IV

EUROPE

I. PHYSIOGRAPHY, CLIMATE, AND PEOPLE

The continent of Europe was named when only the southern part of it was known ; that is, the portion that is separated from Africa and Asia by water. On Figure 365 find what these bodies of water are called. As exploration extended, it was found that Europe was really continuous with Asia, being in fact a great peninsula extending westward. Europe and Asia together actually form a single continent called *Eurasia;* but since Europe has been long considered a separate continent, and has figured so prominently as the home of the civilized races, it seems best to treat it separately.

On the map (Fig. 415) trace the boundary between Europe and Asia. Make an outline map, inserting the boundaries and names of the European countries. Add the names of the seas and the larger islands. What countries are partly or wholly on peninsulas ? Add to the map the large rivers with their names. Where are the chief divides ? Mark with heavy lines the location of the principal mountains (Fig. 365). Write their names on the map. From what has previously been learned, what can you tell about the people of Europe ? About the climate ? What does the peculiar condition of the Caspian Sea tell about the climate in that section ?

Physiography

Highlands and Lowlands. — As in the case of North America, the development of the continent of Europe has required millions of years. Far back in time mountains appeared above the sea in the northwestern portion of the continent. Although greatly worn by the weathering of the ages, and much reduced in elevation, these

mountains may still be seen in Finland, Scandinavia (the peninsula occupied by Norway and Sweden), and Scotland (Figs. 377 and 417), as well as in Germany and Belgium. They resemble the mountains of New England and eastern Canada, that have likewise been greatly worn by weathering.

Other mountain ranges were later formed in southern Europe ; but, like those of western America, they are young and their recent growth has been vigorous. Therefore the *Pyrenees* (Fig. 398),

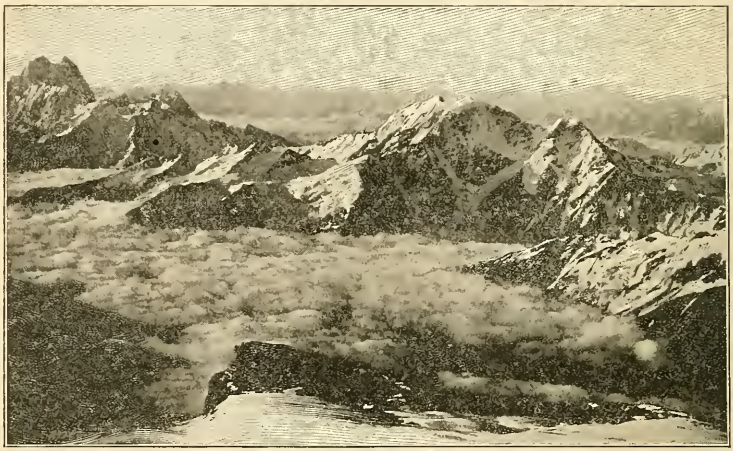


Fig. 368.

A view over the snow-capped peaks of the Caucasus Mountains. A sea of fog fills the valley.

Alps (Fig. 443), and *Caucasus* (Fig. 369) are still of great height. Find each on Figure 365. The mountains of North and South America form continuous chains, with the highest ranges in the west, extending north and south. But in Europe the loftiest mountains are in the south, extending in various directions, though mainly east and west. How does this condition promise a different effect on the climate ? It is to the fact that the mountains are not continuous, and that they consist of chains extending in various directions, that Europe owes much of its extremely irregular outline.

Besides the mountains mentioned, there is a long, low chain, known as the *Urals,* which extends north and south on the eastern side, and for a

part of the distance forms the boundary between Europe and Asia. Other scattered highlands are shown on Figure 365. Where mainly are they situated?

Next to the Caucasus (Fig. 368) the loftiest of all these mountains are the Alps (Figs. 440, 442–444), whose rains and snows find their way to the sea through several of the large rivers of Europe. What are some of their names (Fig. 415). Headwaters of four of these rivers are within forty miles of each other in the Alps. What large rivers of Europe do not rise in the Alps (Fig 365)?

Between the low mountains of the north and east and the higher ranges of the south there is a very extensive lowland (Fig. 365). A part of this has been submerged by the sinking of the land, thus forming the shallow Baltic Sea. Beginning in the west with southern England, and passing through Belgium and Holland, or the "Low Countries," this plain broadens as it extends eastward across Germany (Fig. 369) until it includes almost all of Russia (Fig. 365). Estimate its length east and west. About two-thirds of Europe is included in this plain.

Fig. 369.
Looking across the level plain of north Germany. Peat is dug on this plain near the river.

Coal Beds. — While these mountains and plains were forming, coal beds were also accumulating, as was the case in America (p. 2) during the *Coal Period*.

Figure 366 shows the parts of Europe in which coal beds occur. In what countries are they? Most of the coal is *bituminous* or soft coal, though there is some *anthracite*. In a number of sections *lignite*, or brown coal, is mined; and *peat* (Fig. 369) is also dug for fuel in western Europe, where the damp climate favors its formation.

The Great Ice Sheet. — At the same period that eastern North America was invaded by a great ice sheet from the north, snow accumulated on the highlands of northwestern Europe and spread out-

ward in all directions. Figure 367 shows the extent of the European ice sheet.

One glacier, with its centre in the Scandinavian peninsula, spread southward over the Russian plains, and into Germany and Holland. Smaller ice sheets were developed in the highlands of Scotland, Ireland, and Wales; and these, united, covered all the British Isles, excepting the extreme southern part (Fig. 367). The British glaciers also flowed out into the North Sea and joined forces with the Scandinavian glacier. During this same period the glaciers of the Alps and other mountains were much more extensive than now, extending far down the mountain valleys. These facts are known by the same evidence as in North America (pp. 9–13).

The Coast Line. — The irregularities of the coast line of northern Europe, like those of northeastern North America, are due to the sinking of the land. The Baltic Sea and its gulfs represent old land valleys; and the hills of this submerged land form either islands, peninsulas, or shallow banks where food fish abound.

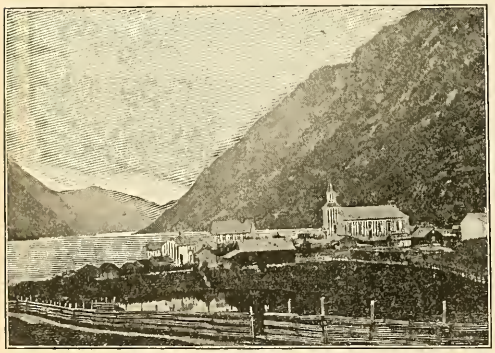


Fig. 370.

A *fjord* on the coast of Norway — a mountain valley into which the sea has been admitted by sinking of the land. (See also Fig. 417.)

It is well proved that, before the Glacial Period, the British Isles were connected with the mainland by low plains where the North Sea and English Channel now exist. An elevation of only a few hundred feet would restore this condition by changing the bed of the North Sea to dry land. This would then extend the continent westward beyond the British Isles, thus destroying the bays and harbors, and altering the entire outline of northwestern Europe.

In southern Europe the rising and sinking of small areas of land — while the mountains were forming — has made many peninsulas, with bays, gulfs, islands, and seas between. The Mediterranean itself occupies a basin, thousands of feet in depth, formed by the

sinking of this part of the earth's crust. Some of these islands, however, are partly or wholly built up by volcanic action. What volcano is on the island of Sicily (Fig. 439)?

Climate

Influence of Latitude. — Trace the 50th parallel of latitude on a globe or map of the world. Notice that while the 49th parallel forms the northern boundary of western United States, it passes entirely south of England, crosses France near Paris, and extends through southern Germany and Russia. From this it is evident that by far the larger part of Europe lies farther north than the United States, and due east of Canada. St. Petersburg is in the same latitude as northern Labrador; and the tips of the peninsulas of southern Europe reach about as far south as the southern boundary of Virginia.

In the far north, near the Arctic, the climate is bleak, and there are barren, frozen tundras. South of this is a belt of fir, spruce, and pine, like that which stretches east and west across central Canada. But contrary to what might be expected from latitude alone, the climate in and just south of this belt of evergreen forest permits the growth of the grains and fruits that flourish in southern Canada and northern United States. In southern Europe, in the latitude of central United States, such semi-tropical fruits as oranges, lemons, olives, and figs are cultivated. That is to say, the products of the greater part of Europe are such as grow several hundred miles farther south in eastern North America.

That these products are raised in great abundance in Europe is indicated by the number of people there; for, although the continent is much less than half the size of North America, it supports four times as many inhabitants, or nearly 400,000,000. Let us see the explanation of these remarkable facts.

Resemblance to Western North America. — In several respects the climate of Europe is so similar to that of western North America that a brief review will be useful. Recall the facts stated on pages 266, 288.

The prevailing westerlies are felt in northern Europe as in the United States. Blowing from the ocean, and, what is especially

important, from across the warm ocean current (p. 284), they distribute an enormous amount of heat over the land. It is the westerlies from these warm waters, more than any other factor, that allow crops to be raised nearer the pole in Europe than in any other part of the globe. If these conditions were not present, much of that densely populated continent (Fig. 364) would be barren waste, like Labrador.

The effect of the ocean winds is naturally greatest near the coast, as in western North America. Therefore England has a mild, rainy climate ; but the farther eastward one goes, the less is the influence of the ocean. Thus eastern Russia experiences great extremes of heat and cold, and there is danger of serious droughts. Compare the summer and winter temperature (Figs. 319 and 320) and the rainfall (Fig. 371) of these two sections.

Southern Europe, like southern California, is not affected by the westerlies in summer, for it then lies within the belt of the horse latitudes. This accounts for the fact that southern Spain, Italy, and Greece receive very little rain in summer. Examine Figure 371 to see where in Europe the rainfall is light. Find some places where there is abundant rain on mountain slopes.

Influence of Cyclonic Storms. — Thus far we have seen a striking resemblance in the climates of the two continents. But there are also notable differences. The westerlies are less regular in Europe than in western North America because of frequent interruption by the cyclonic storms, which, after passing over eastern North America, often cross the ocean and continue across Europe (p. 272). Why cannot their arrival be predicted as well as in the United States ?

As in eastern United States and Canada, the cyclonic storms cause variable winds (Fig. 308). For example, when a storm centre is west of the British Isles the westerlies are checked and the winds blow toward the centre, or *from the east.* But while storm winds from the east bring rain to eastern North America, the same kind of winds cannot bring rain to eastern Europe, because there is no great ocean near at hand to supply the vapor. On account of the absence of ocean water, therefore, eastern Europe has little rain, as eastern America would have if there were land instead of water to the east of it.

Effect of Mountain Ranges. — The direction in which the highlands extend is another cause of great difference between the climates of Europe and America. In America, where high mountains extend north and south along the entire western margin of the continent, the warm, damp westerlies are soon deprived of their moisture. This leaves a vast arid and semi-arid area in the interior.

FIG. 371.

In Europe, on the other hand, where the higher ranges extend nearly east and west, the mountains do not so seriously interfere with the movement of vapor to the interior. Consequently the west winds surrender their moisture only very gradually. This accounts for the fact that in the belt of westerlies, from western Ireland to eastern Russia, there is rainfall enough for agriculture.

The east-west direction of the lofty mountains has a marked influence on the climate of those portions of Europe that lie on their north and south sides. Rising like great walls, the mountains prevent south winds from

bearing northward the heat of the Mediterranean basin; and they also interfere with the passage of the chilling winds from the north. We know that Florida, much farther south than southern Europe, is visited by cold waves and accompanying frosts; but mountain barriers prevent such winds in portions of southern Europe.

Inland Seas. — The numerous inland seas are another great factor in influencing the climate of parts of Europe. Draw a sketch map of Europe, locating these seas. How does the Mediterranean compare in length with Lake Superior? It will be remembered that our Great Lakes produce a marked influence on the climate of the neighboring land, moderating the heat of summer and the cold of winter. It is this influence, added to that of the mountain barrier, that gives to southern Italy, Greece, France, and Spain such an equable and semi-tropical climate. How must these seas influence the rainfall?

People

At the earliest time about which we have definite information, most parts of Europe were inhabited by uncivilized tribes having many different languages and customs. But the more advanced inhabitants of Egypt and southern and eastern Asia had already begun to exert a strong influence upon those Europeans who dwelt nearest them along the Mediterranean shores.

The Greeks. — Among the latter the Greeks took the lead. Their warm climate was favorable to many kinds of vegetation, and still not so hot as to destroy the energy of the people. Good harbors were numerous; the sea was so narrow that it could be crossed with safety; and thus navigation developed. Not only were the valuable treasures of neighboring shores brought in ships, but much trade was also carried on with the Far East by means of caravans that crossed the intervening deserts.

In time the Greeks even surpassed their teachers, the Asiatics, and became the most highly civilized people of the world. The writings of the ancient Greek philosophers, and the works of art produced by their sculptors, are to this day classed among the most wonderful of man's works. They also founded the first republics, or governments by the people, of which we have historic account. But the fact that Greece is so mountainous, with many enclosed valleys, was unfavorable to the development of a united, powerful nation; and the country

was therefore divided into small and independent states. This weakness accounts in part for the fact that, before the time of Christ, the Greeks were conquered by their neighbors.

The Romans. — Their later conquerors, the Romans, lived in Italy, with ROME as their capital. The Romans possessed a remarkable power for organization, and grew into a great nation, not only subduing the tribes around them, but finally obtaining control of all the countries bordering the Mediterranean. They even waged victorious war far to the north and west, under the leadership of Julius Cæsar, and for hundreds of years the Rhine and Danube rivers marked the northern boundary of the Roman Empire.

Much of this territory was held by force and governed by rulers sent from Rome. You see on the map (Fig. 365) that the sources of these two rivers are close together in the Alps, and that they form an almost continuous line from the North to the Black Sea. While the Romans claimed all territory south of this border, wild, barbarous tribes possessed all upon the other side. Thus Europe was divided into parts, controlled by two very different classes of people.

In time the Roman Empire began to decay. Their barbarian neighbors, on the other hand, were increasing in power. They were a hardy, energetic people, and they knew how to apply the many lessons learned from the Romans. The time came when they ceased to fear their once powerful foes. Then one body after another marched into the Roman territory as conquerors, finally sacking the city of Rome in the year 410.

Later Development of European Nations. — Thus we see that, while the Roman Empire was at one time far-reaching, it did not succeed in binding its various peoples closely together, as one great nation with common interests. Nor have their descendants been brought together since that time. One of the most important reasons for this failure is the fact that so many parts of the continent are quite detached from all others. Spain, for example, is not only a peninsula, but it is separated from France by a high range of mountains. The British Isles are entirely cut off by water; Scandinavia nearly so; and Italy itself is bounded on the north by lofty mountains, and by water on all other sides. It is natural that people

living in such isolated positions should not feel a common interest with those who are so separated from them. Thus have arisen many different customs, beliefs, and languages.

In consequence of such differences and lack of common interests there are many more nations in Europe than in North America. Count them (Fig. 415). There have been many jealousies and disputes between them which have been settled by war, and their boundaries have been subjected to numerous changes, as one nation or another has seized territory during war. Notice also how irregular are some of the boundary lines. Those of Germany, for example, have been determined only after the loss of tens of thousands of human lives.

Influence of the Discovery of America. — Of the many great achievements of Europeans within modern times, probably the greatest was the discovery of America. In thinking of this event we are apt to consider only the mighty influence Europe has had on America. But the New World has also exerted a powerful influence upon Europe. The encouragement given to navigation by this discovery led Europeans to explore other parts of the world. Their knowledge was thereby greatly increased and their wealth as well. Also, the crowded condition of Europe has been much relieved ; for many nations have poured forth emigrants, not only to North and South America, but also to Australia and Africa, and, more recently, even to Asia. It is a peculiar tie that binds the newly settled countries to Europe ; for, inasmuch as that continent has furnished most of the civilized population to these newer lands, it may be considered the *Fatherland* of them all.

Review Questions. (1) Give reasons for and against treating Europe as a separate continent. (2) Tell about the highlands. (3) The lowlands. (4) The coal beds. (5) The Ice Age. (6) Locate the boundary of the ice sheet (Fig. 367) on Figure 415. (7) Tell about the coast line in northern Europe. (8) In southern Europe. (9) Of what advantage is the irregularity of the European coast? (10) Give the latitude of northern and of southern Europe. (11) How about its vegetation? (12) Its population? (13) Remembering its latitude, explain the mild climate of Europe. (14) How are its regular westerlies interfered with? (15) How is the east and west direction of its mountain ranges of great importance? (16) What is the influence of its inland seas? (17) Tell about the

inhabitants of Europe in early times. (18) Which country took the lead in making progress, and why? (19) Tell about the Greeks. (20) About the Romans and the extent of their territory. (21) Give some reasons why Europe is divided into so many nations. (22) How has the discovery of the New World proved of great benefit to Europe? (23) In what respect is Europe the Fatherland of other countries?

Correlation with North America. (1) Compare Europe with North America in regard to highlands. (2) To lowlands. (3) Distribution of coal beds.[1] (4) Extent of ice covering. (5) Irregularity of coast lines. (6) Latitude. (7) Vegetation (see also pp. 24–25 and 296–298). (8) Population. (9) In what respects are the two continents alike in climate? (10) In what respects unlike? (11) Compare the number of degrees of longitude in Europe with the number in North America. (12) Are the cyclonic storms as much needed in Europe as in America? Why? (13) Why should the most densely populated part of Europe be on the western side, while the most densely populated part of North America is on the eastern side?

Suggestions. (1) What results might follow if the mountains of Europe extended north and south near the western coast? (2) What disadvantages do some of the European countries suffer in consequence of the east and west direction of the mountains on their southern boundaries? (3) Mention some of the results if the land should rise near Gibraltar, changing the Mediterranean to a closed sea. How would the British Isles be influenced? Also Italy? (4) In what section would you expect to find most wild animals? (Fig. 364.) (5) Give reasons why some European countries, such as Germany, take much better care of their forests than Americans do. (6) Can you tell about any of the great wars and great generals of Germany, England, or France? (7) Can you tell of any of the changes in boundary lines; for example, in Poland, or between France and Germany? (8) Explain how the adoption of Christianity by the Roman government was an event of great importance. (9) What distinguished Greeks and Romans can you name?

[1] Some of these comparisons will be made easier by examining the figures on pages 224–235.

II. THE BRITISH ISLES

Position, Size, and Importance. — London is fully seven hundred miles farther north than New York City, and the British Isles are in the same latitude as Labrador. England itself is smaller than New England; and the British Isles, including England, Wales, Scotland, Ireland, and several hundred small islands, are not much larger than the state of Colorado.

Yet in spite of their northern position and small area, the largest city in the world is located in the British Isles. More than that, Great Britain has more manufacturing, after the United States, more foreign trade, a greater number of vessels upon the sea, and more colonies (Fig. 372) than any other nation in existence (Fig. 416). There are of course reasons for these remarkable facts, and we shall next look for them.

Inhabitants. — The British people doubtless offer one important explanation of the above facts. Being so near the mainland the islands have been invaded by many hardy people, among them the *Angles* and *Saxons*, from whom the words *English* and *Anglo-Saxon* have been derived. The *Normans* also entered Britain, and still earlier the Romans under Julius Cæsar.

Fig. 374.
Ancient cottage near the Lakes of Killarney in Ireland.

Although formerly divided into different nations, England, Scotland, and Ireland are now united to form the *United Kingdom* of Great Britain and Ireland. The inhabitants of each of these sections are

BRITISH EMPIRE.
United Kingdom, thus:...
Dependencies, thus:...
All names pertaining to the British Empire are in Gothic thus: GIBRALTAR
ARCTIC OCEAN
GREENLAND
FRANZ JOSEF LAND
ALASKA
HUDSON BAY
LABRADOR
DOMINION OF CANADA
NORTH AMERICA
OTTAWA
NEWFOUNDLAND
San Francisco
UNITED STATES
New York
BERMUDAS
BAHAMAS
TURKS IS.
Havana
ATLANTIC OCEAN
PACIFIC OCEAN
JOHNSTON I.
PALMYRA I.
FANNING I.
WASHINGTON I.
CHRISTMAS I.
PHOENIX IS.
DUDOZA
UNION IS.
MARVIS I.
MALDEN I.
STARBUCK I.
MANIHIKI IS.
SUVAROF IS.
PALMERSTON IS.
HERVEY OR COOK IS.
TONGA OR FRIENDLY IS.
KERMADEC IS.
CHATHAM IS.
DUCIE I.
PITCAIRN I.
BRITISH HONDURAS
JAMAICA
WINDWARD IS.
LEEWARD IS.
BARBADOS
TRINIDAD
Panama
BRITISH GUIANA
SOUTH AMERICA
Rio Janeiro
Valparaiso
Buenos Ayres
FALKLAND IS.
C. Horn
SOUTH GEORGIA
Longitude West from Greenwich
Arctic Circle
SHETLAND IS.
BRITISH ISLES
LONDON
CHANNEL IS.
Paris
EUROPE
Vienna
St. Petersburg
RUSSIAN EMPIRE
Siberia
ASIA
Peking
JAPAN
Tokio
CHINA
HONGKONG
PHILIPPINE ISLANDS
GIBRALTAR
MALTA
CYPRUS
SUEZ
BAHREIN IS.
CAIRO
EGYPT
BALUCHISTAN
SIKKIM
CALCUTTA
INDIA
BOMBAY
KURIA
MURIA IS.
SOKOTRA
LACCADIVE IS.
CEYLON
ANDAMAN IS.
NICOBAR IS.
MALDIVE IS.
STRAITS SETTLEMENTS
LABUAN
NORTH BORNEO
SARAWAK
GILBERT IS.
SOLOMON IS.
ELLICE
DUFF IS.
SANTA CRUZ IS.
ROTUMAH
FIJI IS.
NEW GUINEA
LOUISIADE ARCH.
NEW HEBRIDES
NORFOLK I.
LORD HOWE
SYDNEY
MELBOURNE
TASMANIA
NEW ZEALAND
BOUNTY IS.
STEWART I.
AUCKLAND I.
ANTIPODES IS.
CAMPBELL I.
MACQUARIE I.
EMERALD I.
ROYAL COMPANY IS.
AUSTRALIA
INDIAN OCEAN
CHAGOS IS.
CHRISTMAS I.
GOCOS IS.
CARGADOS IS.
RODRIGUEZ I.
MAURITIUS
SEYCHELLES
AMIRANTE IS.
ALDABRA IS.
ZANZIBAR
AFRICA
BRITISH EAST AFRICA
BRITISH SOMALI LAND
BRITISH CENTRAL AFRICA
BRITISH SOUTH AFRICA
TRANSVAAL COLONY
ORANGE RIVER COLONY
NATAL
CAPE COLONY
C. OF GOOD HOPE
TRISTAN DA CUNHA
ASCENSION I.
ST. HELENA
WALFISCH BAY
ICHABOE I.
GAMBIA
SIERRA LEONE
GOLD COAST
LAGOS
SHANTI
NIGER TERRITORIES
KAMARAN
ADEN
BERM
Scale along the Equator.
0 1000 2000 5000
Statute Miles.
THE M.-N. CO.
Longitude East from Greenwich

FIG. 372.

BRITISH ISLES.
Scale of Miles.
0 50 100
Cities with over 1,000,000 . . . . London
Cities with 200,000 to 1,000,000 . . Liverpool
Cities with 100,000 to 200,000 . . . Portsmouth
Smaller Places . . . . . Plymouth
Capitals of Countries Other Places
Longitude 6 West from 4 Greenwich 2
SHETLAND ISLANDS
ORKNEY IS.
C. Wrath
Duncansby Hd.
OUTER HEBRIDES
LEWIS
The Minch
Moray Firth
Kinnaird Head
NORTH SEA
Inverness
SKYE
Aberdeen
ATLANTIC OCEAN
SCOTLAND
Ben Nevis
Perth
Dundee
Firth of Tay
MULL
Firth of Lorne
Firth of Forth
Edinburgh
ISLAY
Greenock
Paisley
Glasgow
R. Tweed
ARRAN
Kilmarnock
Malin Head
North Channel
Firth of Clyde
Bloody Foreland
Londonderry
L. Foyle
Dumfries
Cheviot Hills
Newcastle
Sunderland
R. Tyne
Donegal Bay
Lough Neagh
Belfast
Solway Firth
Pennine Range
Sligo
ISLE OF MAN
Dundalk
Dundalk Bay
Bradford
Leeds
Hull
Preston
Blackburn
Bolton
Salford
Oldham
Sheffield
R. Humber
IRELAND
Irish Sea
Galway
Dublin
Liverpool
Manchester
ANGLESEY
Galway Bay
R. Shannon
Nottingham
The Wash
Snowdon
Derby
Trent
Leicester
Limerick
Cardigan Bay
ENGLAND
Norwich
Birmingham
Wolverhampton
Waterford
Dingle B.
Lakes of Killarney
Cork
Carnsore Pt.
St. George's Channel
WALES
Cambridge
Queenstown
Oxford
Swansea
Merther-Tydfil
London
West Ham
Mizen Head
Cardiff
Bristol
Thames
Bristol Channel
Bath
Croydon
Dover
ATLANTIC OCEAN
Southampton
Brighton
Portsmouth
Strait of Dover
I. OF WIGHT
Plymouth
Lands End
SCILLY IS.
English Channel
Cherbourg
CHANNEL IS.
FRANCE
THE M.-N. CO., BUFFALO, N.Y.

FIG. 373.

noted for their energy, intelligence, and high ideals which in no small measure account for their success as a nation.

Physiography and Climate. — The southwesterly winds from over the warm ocean (p. 341) also partly account for the greatness of the British Empire. Two days out of three these winds blow across the British Isles; and, since they have traversed a vast expanse of warm water, they greatly temper the climate. Indeed, the winter season is milder than that in northern United States, and the summer is cooler (Figs. 319 and 320).

The prevailing westerlies, carrying an abundance of moisture (p. 342) so distribute it over the islands that no section suffers from drought. Yet the western portions receive more rain than the eastern because the ocean winds visit them first (Fig. 375).

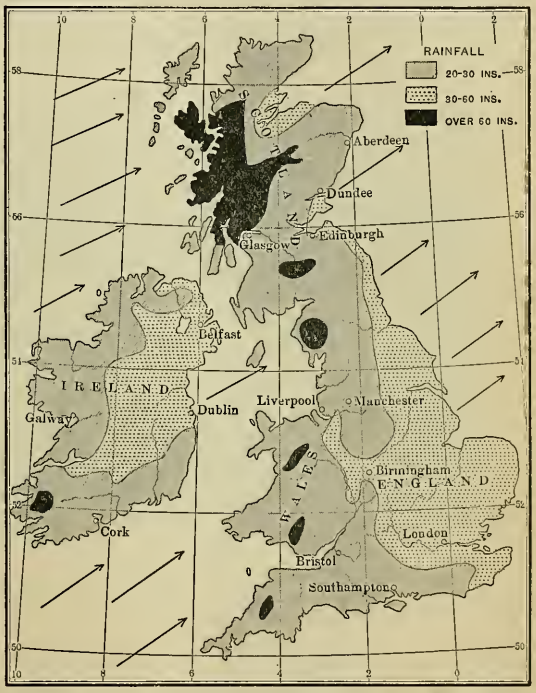


FIG. 375.
Rainfall map of the British Isles.

The highlands also influence the rainfall. A highland rim extends around Ireland (Fig. 373), giving to the surface of that island the form of a shallow plate. How does that influence the rainfall? (Fig. 375). Highlands are also found in Wales, western England, and most of Scotland (Fig. 373).

As already stated (p. 338), the mountains of Great Britain, like those of New England, are so old that they are worn very low. While this upland is rarely more than one or two thousand feet

above sea-level, there are occasional peaks of hard rock that rise to a greater height. For example, the granite peak of Ben Nevis in Scotland, the highest point in the British Isles, is forty-three hundred feet in elevation. The Scotish Highlands (Fig. 377) are so rugged and barren that few people are able to live there.

Where the rocks are softer and less disturbed by folding there are lower and more level tracts, or plains. Point out the broadest plains of Ireland, Scotland, and England (Fig. 373). Notice especially the narrow lowland of southern Scotland, near Edinburgh and Glasgow.

Fig. 376.

The beautiful Loch Lomond in Scotland, a lake caused by the glacier.

There the rocks are so much softer than those of the Highlands that instead of a barren, hilly country, there is a fertile lowland, upon which, as in many parts of England, there are thriving industries.

What have you already learned (p. 340) about the Great Ice Age in the British Isles? As in northeastern North America, the glaciers had an important effect upon the soil and caused many lakes (Figs. 376 and 382). Explain how.

The coast line is very irregular, as can be seen from the map (Fig. 373). How does the coast compare with that of New England? You have already learned that this irregularity is due to sinking of the land; and that the many islands are the crests of former hills, while the bays and harbors are submerged valleys.

Since the mountainous western portion had more deep valleys for the sea to enter than the level plains of the east, there are more good harbors on the west coast than on the eastern side of the islands. On both sides, however, the mouths of the larger rivers usually make good ports. Why?

Agriculture. — In connection with agriculture, much live stock is raised. In fact, grazing has of late so increased in importance that there is now twice as much land in pasture as in crops, and the British Isles are noted for their great number of fine cattle, sheep, and horses.

FIG. 377.
Pasture land in the Highlands of Scotland.

The importance of grazing is partly explained by the fact that much of the surface, like that of New England, is too rocky or mountainous to be cultivated (Fig. 377). Besides this some of the plains in eastern England, although too sterile for farming, make excellent pasture land. Two other facts favorable to stock raising are the mild winters and the damp atmosphere which encourages the growth of grass. In addition to these causes, the cheapness with which grain is raised in other countries, like the United States, and transported to the British Isles on the large steamships, has made it less necessary for the British to raise grain.

Several of the smaller islands are also widely known for live stock. For instance, the Shetlands are famous for Shetland ponies; and on the three Channel Islands, — Jersey, Guernsey, and Alderney, — near the French coast, three breeds of cattle have been developed which are well known in the United States.

The cool summer climate, which is of advantage in some respects, is unfavorable to many kinds of farming; for example, it prevents the production of corn, cotton, tobacco, and grapes, which require warm summers. More hardy products, however, as oats, barley, and wheat, are extensively cultivated. Turnips, potatoes, beans, and

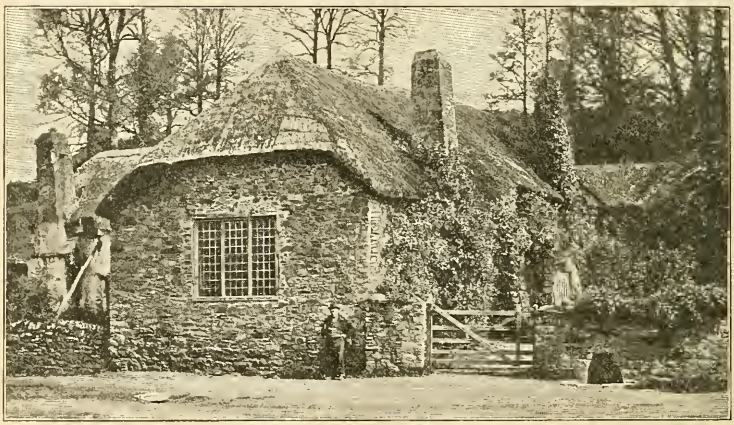


FIG. 378.
A cottage in southwestern England.

peas are other important crops; also hops, which, together with barley, are used in the manufacture of beer. Owing to the many towns and cities, truck farming is of importance.

The demand for farm land has been so great that large areas of swamp have been reclaimed by careful drainage, and these now make the most fertile farms. But in spite of the care that has been given to cultivating the soil and to raising live stock, far less food is produced than is needed by the inhabitants. Such vast multitudes are engaged in other occupations that if they were deprived of food from abroad, they would, it is said, begin to suffer from famine within a month. How different that is from our own country, whose area is so large, and climate so varied, that

it not only supplies the food we need, but produces enormous quantities to be sent abroad.

Fishing. — Since the early inhabitants had to cross the sea in order to reach these islands, and since most of their descendants have lived either on or near the coast, it is natural that, as a people, they should become accustomed to a seafaring life. This sort of life has also been encouraged by the fact that food fish abound on the shallow banks of the North Sea and of the ocean to the north and west of the islands. More than one hundred thousand men and twenty-five thousand boats from the British Isles are employed in the fishing industry. Among the fish caught are cod, haddock, and herring, as off the coast of New England and Newfoundland. Another important kind is a flat-fish, the sole, which resembles the flounder of the New England coast. Salmon enter the rivers of northern Great Britain, and oysters are found along the southern coast.

Many fishing hamlets are scattered along the shore; but the fishing industry here, as in New England, is becoming more and more centralized in the large towns, which possess the capital for large vessels and expensive fishing outfits. The chief centres of the trade, like Boston and Gloucester in Massachusetts, are LONDON, HULL, and GRIMSBY (Fig. 384, near Hull) in England, and ABERDEEN in Scotland.

FIG. 379.

A map showing the coal fields of the British Isles. Why are so many of the large cities on or near the coal fields?

Mining. — One of the resources of the British Isles which early attracted people from southern Europe was the tin in southwestern England. This metal is not mined in many parts of the world,

but has always been in great demand; and even before the time of Cæsar, ships from the Mediterranean came to England to obtain tin for use in the manufacture of bronze. Small quantities of copper, lead, zinc, and even gold and silver ores have also been discovered in the British Isles, but at present there is almost no mining of these metals.

On the other hand, the abundance of two other minerals, coal and iron ore, reminds us of our own country. This one small island of Great Britain produces almost as much coal as all of our states together; and the United States and Great Britain are the leading coal-producing countries of the world. Figure 379 shows the sections of Great Britain in which coal is found. While most of the coal is bituminous, that in South Wales is mainly anthracite. Large numbers of miners in the United States are Welshmen who have come from that section.

Parts of Great Britain possess the same advantage as Birmingham, Alabama, whose name, in fact, is derived from the close resemblance of conditions about it to those about Birmingham, England. None of the British iron ore is far from coal; and in places the same shaft is used to bring both coal and iron to the surface. Limestone is also abundant and near at hand. What suggestions do these facts give concerning the development of manufactures and the location of large cities?

Besides these minerals, various building stones are extensively quarried, as granite in Scotland, and slate in northern Wales. Salt is also found; and there is clay of such excellent quality for earthenware that several towns have become noted for their potteries, as Trenton and Cincinnati have in the United States. The extent of the mining industry in the United Kingdom is indicated by the fact that more than half a million persons are employed there underground.

Reasons for Development of Manufacturing. — Considering the abundance of coal and iron ore on the one hand, and of wool from the millions of sheep on the other, it is clear that Great Britain is able to manufacture extensively. Even in very early times the English were engaged in the weaving of woollen cloth. Later, owing to numerous wars and to the oppression from rulers on the

continent, England became a refuge for oppressed industrial people from the mainland, so that such manufacturing rapidly increased.

As in New England, the hilly sections have abundant water power due to the glacier. This also favored manufacturing ; and later, when steam was employed, the abundant stores of coal were of great importance. The use of steam has led to the building of many factories, and to the growth of manufacturing centres. Therefore, the making of cloth on hand looms at the homes of the weavers has been generally abandoned.

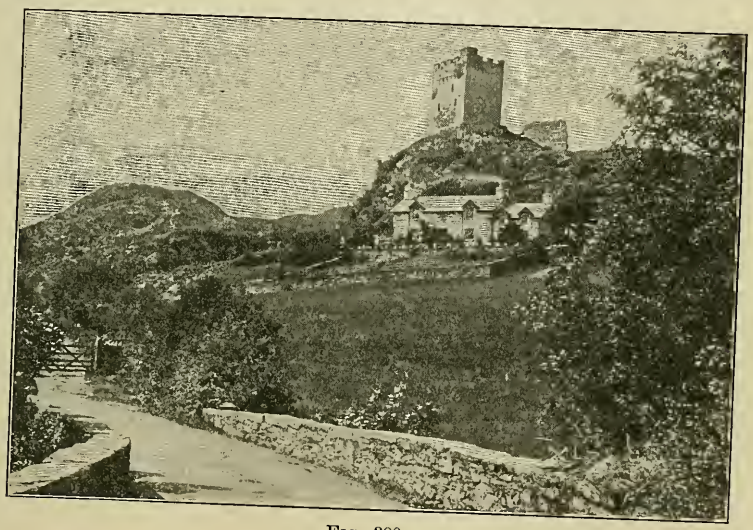


FIG. 380.
A castle in Wales, situated on one of the hills of hard rock.

The peculiar energy and inventive genius of the British, which kept their machinery in advance of that used by other nations, must also be considered. For example, it was the Scotchman, James Watt, who invented the modern steam engine; and it was George Stephenson who invented the first locomotive. The very smallness of the country is another advantage; for no matter where a factory may be located, it is near the coal fields and within a few miles of a shipping point.

Woollen and Cotton Manufactures. — In the mountainous section of northern England, near both coal and wool, are hundreds of fac-

tories engaged in the manufacture of woollen cloth. The principal centre of this trade is LEEDS, which has the added advantage of water power. On the western side of this hilly region is BRADFORD, noted for its broadcloth and worsted goods; and neighboring cities manufacture woollen yarn, hosiery, carpets, and blankets. The woollen industry extends northward into Scotland and southward to LEICESTER, whose surrounding plains produce a breed of sheep that yields a wool for worsted yarn.

From the spinning and weaving of wool it was easy to move to cotton manufacturing; and on the western side of the northern mountains we find a great cotton-manufacturing industry. Dampness is one of the points in favor of that section, for in a dry air cotton is in danger of becoming too brittle to spin and weave easily. Another reason why this work is best developed on the west side of the island is the fact that it is nearer the United States, from which so much of the raw cotton comes.

The centre of the cotton manufacturing is MANCHESTER. What cities do you find located near by? This portion of Great Britain, including southern Scotland and the two sides of the mountain range of northern England, is the seat of the greatest textile industry in the world. Can you name cities of New England which are likewise engaged in cotton and woollen manufacture?

In spite of the enormous number of sheep in the British Isles, the manufacturing industry has so far outgrown the local supply of wool that millions of pounds must be imported every year. This condition resembles that of New England, where much of the wool is brought from Ohio and more western states, as well as from foreign countries. As to cotton, since the British climate will not permit its cultivation, it is necessary to import about two billion pounds a year to supply the mills. Although much cotton is now obtained from Egypt, India, and other parts of the British Empire, our Southern States still supply the greatest quantity.

Iron and Steel Manufacturing. — The cities in Great Britain that are most noted for iron and steel products are BIRMINGHAM and SHEFFIELD in England, and GLASGOW in Scotland. BIRMINGHAM manufactures jewelry, watches, firearms, bicycles, steam engines, etc. SHEFFIELD has for centuries been distinguished for cutlery, the

existence of grindstone quarries in the neighborhood being a partial reason for this particular industry. Why? It also manufactures steel rails and armor plates for warships. GLASGOW is a centre for shipbuilding and for the manufacture of locomotives and machinery of various kinds.

In cities round about these places are similar works; and as in New England, many of those occupied with the textile industry also produce textile machinery and other iron and steel goods. The island is so small that coal and iron are cheaply shipped to various points; and on this account, manufacturing, though best developed near the coal fields, is not confined to these districts.

Thus we see that here, as in the United States, coal makes possible an enormous industrial development. But in spite of the forest

FIG. 381.

The Clyde, at Glasgow. Fifty years ago the river could be forded at this place, but it has been deepened by dredging so that the largest vessels now enter.

of chimneys in England and southern Scotland, the output of coal is more than sufficient to meet the demands. The materials to be manufactured, however, are not sufficient; for all the cotton, much of the wool, and part of the iron ore must be imported.

These three industries, connected with cotton, wool, and iron, have made Great Britain one of the great work-shops of the world. The most important is cotton manufacturing; iron ranks next, and wool is third.

Ireland. — Ireland forms a striking contrast to Great Britain in several respects. In the first place it is mainly a country of farms

instead of manufactures. The mild climate and damp atmosphere insure excellent grass throughout the year, and about four-fifths of the farm land is in pasture. It follows, therefore, that great numbers of cattle, sheep, and horses are raised. As in Great Britain, the principal grain is oats; but barley, wheat, potatoes, and turnips are also raised.

Again, unlike Great Britain, Ireland is very barren of minerals. Building stones, such as granite, marble, and sandstone, are found, but there is extremely little coal or iron. For that reason, whatever manufacturing has been developed is located chiefly on the eastern

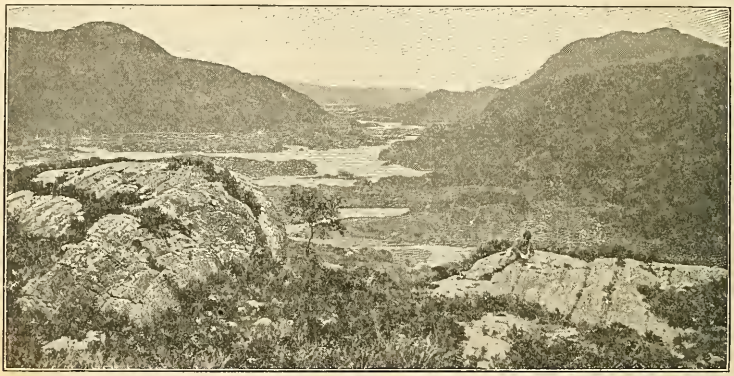


FIG. 382.

The famous lakes of Killarney in the hilly part of southwestern Ireland. They are formed where glacial drift has obstructed the drainage.

side, where coal is easily obtained from England or Scotland. At one point the two islands are only thirteen miles apart.

The lack of coal for use in the homes is partly made up by the abundance of "turf" or peat. Owing to the deposits of glacial drift, which have obstructed the streams (Fig. 382), the level interior is so poorly drained that marshes or bogs occupy about one-twelfth of the entire surface of the island. The water in these bogs protects the swamp vegetation from decay, so that it accumulates, forming a sod, which, when dug up and dried, makes a fairly good fuel. It will be remembered that similar deposits, in the larger swamps of the Coal Period, caused the coal beds which are now of so much value (p. 3).

While manufacturing is little developed, there is one kind that flourishes in Ireland; namely, the making of *linen*. The Irish linens, which take high rank in our country, are made from the inner bark of the flax plant. Flax is grown in various parts of the United States, but mainly for the sake of the seed, from which linseed oil is made for use in mixing paints and in making varnish. In Ireland, however, flax is raised chiefly for its fibre.

The damp climate of Ireland is favorable to the growth of flax, and the cheap labor makes possible the great amount of care required in preparing it for the manufacture of linen. The stem of flax is tall and slender, and a field of it presents somewhat the same appearance as a field of oats. Instead of being cut, like grain, it is pulled up and left lying upon the ground for some time, exposed to the dew and weather, so that the gummy substance, which holds the woody matter and fibre together, may decay. After the fibre has been separated from the woody core by machinery, it is split and combed out with a steel brush and thus made ready for spinning.

Travellers in northern Ireland in summer see field after field covered with flax, which is used chiefly in linen factories at BELFAST. The fibre is made into thread in much the same manner as cotton or wool, and this is then woven into napkins, tablecloths, etc. Name other articles made of linen.

Ireland forms a third contrast to Great Britain in regard to population. Not only is it far less densely peopled, but the number of inhabitants is decreasing. Partly because of the unfavorable laws imposed by England, the Irish have long been discontented with their lot; and since the disastrous potato famine in 1846, they have been abandoning the country. They have sought refuge chiefly in America, and since the above date, the number of inhabitants has been reduced from 8,000,000 to 5,000,000.

Location of Principal Cities. — The cities most distinguished for manufacturing have already been mentioned; namely, LEEDS, BRADFORD, MANCHESTER, SHEFFIELD, BIRMINGHAM, and GLASGOW. What industries are developed in each?

There are other large cities along the coast; for so much manufacturing calls for an enormous import of raw materials and food, as well as the export of manufactured goods. These cities must, therefore, be the gateways to and from the island. And since Great Britain lies rather far north, between Europe and the New World, these shipping points must be located on the eastern, western, and

southern sides, at those points where the best harbors exist, and not far from the great industrial centres.

First among the coastal cities to be noted is LONDON, with BRISTOL opposite it on the west. Farther north is HULL, with LIVERPOOL on the opposite side; and in southern Scotland is EDINBURGH, near the coast, paired with GLASGOW on the west. On the south side the two most important ports are SOUTHAMPTON and PORTSMOUTH. What are the principal cities of Ireland? Steamships, railway lines, and canals connect the various cities,

FIG. 383.

Commerce on the Thames below London Bridge.

carrying immense quantities of freight. In Great Britain and Ireland there are nearly four thousand miles of canal and over twenty-one thousand miles of railway.

London. — This city, the largest in the world, is situated on the Thames River. The Thames, like many other British rivers, has a wide, deep mouth, owing to the sinking of the land, and London is located as far inland as high tide allows vessels to go, or fifty miles from the open sea. The advantage of this position lies in the fact that it is in the interior of the island, yet has direct water communication with foreign countries.

As in all great cities, one of the principal industries is manufacturing, nearly all kinds of goods being made, as in New York, Chicago, and Philadelphia. But New York, we know, owes its greatness largely to the fact that it is the gateway to a vast productive interior, while almost any point in England can be reached by rail from London in a few hours. Nevertheless, although Great Britain is small, its population is nearly one-half as great as that of the United States, and the port of London is the point of entrance for much of their food.

In fact, this is the greatest shipping point in the world. Its rows of piers extend twenty miles down the river, and its railways radiate in all directions (Fig. 384). However, the fact that London lacks coal and iron near at hand, places it at some disadvantage compared with Liverpool and Glasgow.

Besides being the capital of the *British Empire* (Fig. 372), which is the name applied to the United Kingdom and its dependencies, London is the centre for the publication of books and magazines, and is provided with noted picture galleries, libraries, museums, and many magnificent buildings. Its wealth and trade are so extensive that it has been the money centre of the world, though New York, the money centre of the United States, now rivals it. The leading bank, called the Bank of England, is the agent of the government in many of its business transactions and employs about a thousand persons.

Being a very old city, many of the London streets are narrow and crooked. Some of the principal streets are too narrow for street cars, so that, unlike American cities, the people have to be transported mainly by omnibuses. One of the largest companies runs thirteen hundred buses, and employs five thousand men and fifteen thousand horses. However, an underground railway, which encircles the great city, running under houses and streets, carries an enormous number of passengers.

Near London are many places of interest. Just below the city, on the south side of the river, is the Greenwich observatory (p. 39), from which meridians of longitude are numbered and time is regulated. A few miles up the river is Windsor Castle (Fig. 385), the palace of the sovereigns of the Empire. Find CAMBRIDGE and OXFORD (Fig. 384), the two leading university towns of Great Britain.

FIG. 384.

The location of London and of Liverpool.

Other English Cities. — Southwest of London, on the coast, is SOUTHAMPTON, where ocean steamers from the United States often stop (Fig. 389), and where fast trains wait to convey passengers to the metropolis. Close to Southampton is PORTSMOUTH, which has a great navy yard.

Almost due west of London, at the mouth of the Severn River, is BRISTOL, which is engaged in the lumber trade and in the manufacture of tobacco and chocolate. It was formerly next to London in size, but Liver-

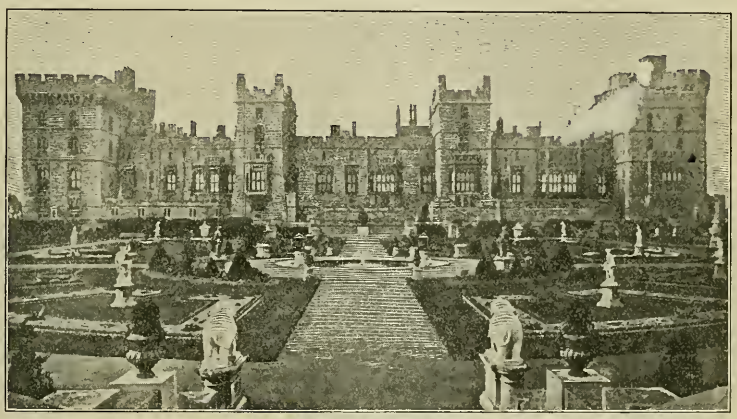


FIG. 385.
Windsor Castle.

pool has now far outstripped it. Can you suggest some reason why? Just west of Bristol is CARDIFF in Wales, the chief point in Great Britain for the export of coal.

Knowing the occupation of the dense population in northern England, we can tell the principal exports of HULL and LIVERPOOL. What must they be? The former city naturally trades mainly with Europe, and the latter with the Americas and West Africa.

Before the discovery of the New World, the west side of Great Britain had little commerce, and LIVERPOOL (Fig. 384), therefore, had little business or growth. But with the settlement of America the city grew until it now has an immense trade with North and South America, and is the third city in size in the United Kingdom. Many passengers from America land at this port and go by rail to

London. Besides its commerce, Liverpool is also important for its shipbuilding. What circumstances are favorable to that industry? A ship canal, about thirty-five miles in length, has recently been built to MANCHESTER, at an expense of $75,000,000.

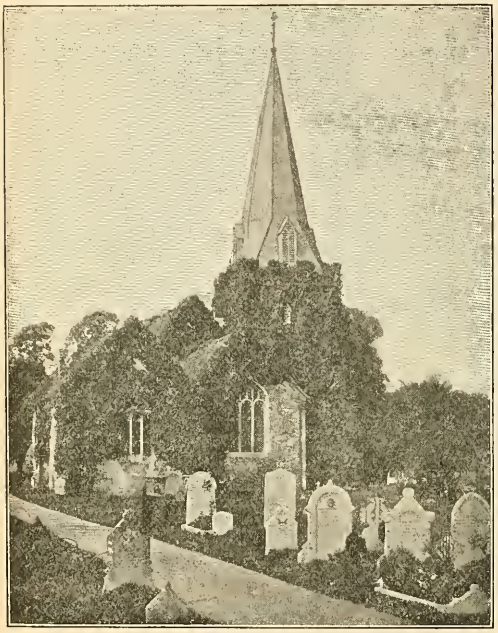


FIG. 386.
The churchyard described in Gray's "Elegy."

Cities of Scotland. — GLASGOW (Fig. 381), on the western side of the lowland plain of southern Scotland, is not only a great manufacturing centre, but it is also a leading shipping point for the same reasons that Liverpool is. State them. What must be some of its principal imports and exports? Why?

EDINBURGH, unlike the other great cities named, is neither a shipping point nor an important manufacturing centre. It is distinguished as the capital of Scotland, and as one of the most beautiful cities of the British Isles. Its importance is historical rather than commercial; for in the early days it commanded the entrance to the lowland of southern Scotland. The well-known University of Edinburgh is situated here. LEITH, a short distance away, is the port for Edinburgh.

Farther north an the coast are the important ports of DUNDEE and ABERDEEN (p. 353). The former sends forth a number of Arctic whaling vessels each year, and is also engaged in the manufacture of linen and other textiles.

Cities of Ireland. — The principal cities of Ireland are on the east and south sides. Why? What has already been said about BEL-

FAST? (p. 359.) It is also noted for its shipbuilding. DUBLIN, the capital and largest city, and the chief port for the English trade, ships farm and other products to England and receives manufactured goods in return. QUEENSTOWN has a fine harbor, and is a stopping point for some of the vessels bound from America to Great Britain.

Fuller Reasons for the Greatness of the British Empire. — While we have learned many facts about the British Isles, some important questions are not yet fully answered. For example, why does this little country possess more colonies (Fig. 372) than any other

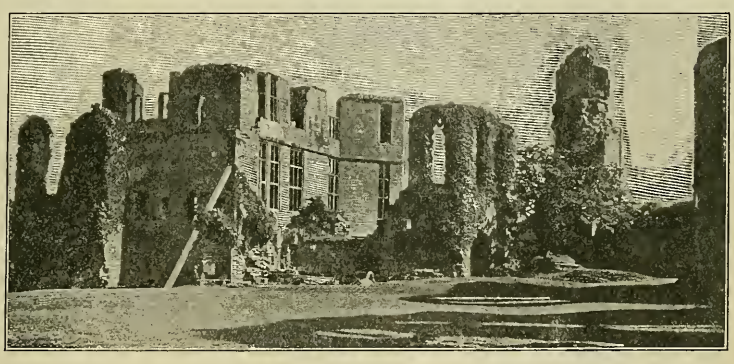


FIG. 387.
Kenilworth Castle, described by Scott in "Kenilworth."

nation of the earth? Further, why should it have the greatest foreign trade? And why the greatest number of vessels upon the sea?

Some of the reasons in answer to these questions are as follows. The fact that Great Britain is so small — it is impossible to find a point more than seventy miles from the salt water — is a reason why many of the British have been sailors. It is not surprising, therefore, that they have produced many explorers, such as the Cabots who sailed from Bristol, Sir Francis Drake, and Sir Walter Raleigh. What parts of the world did they explore?

Nor is it to be wondered at that, as these explorers discovered new parts of the world, they laid claim to them in the name of their mother country. In this way, and by war, Great Britain came into

possession of the Thirteen Colonies of North America, Canada, India, Australia, much of Africa, and many other places (Fig. 372). At present her territory includes about one-fifth of the land surface of the globe and one-fourth of its inhabitants.

These colonies and dependencies help to explain Great Britain's enormous foreign commerce; for the colonies have found it more advantageous to trade with the mother country than with other nations speaking a different language and having less understanding of them or sympathy with them. They sell to her their raw products, including food, and she in return sends to them clothing, steel goods, and other manufactured articles. It is largely the exchange of goods with these colonies that has made the foreign trade of Great Britain nearly twice that of any other nation. Next to her colonies Great Britain's greatest trade is with the United States.

Fig. 388.

Shakespeare's house at Stratford-on-Avon. Since this picture was taken, the house has been somewhat changed in appearance.

Some of the reasons why this little island should own more vessels than any other nation have already appeared. In fishing, exploring, and making settlements, a large number of ships have been needed; and for the proper defence of her widely distributed colonies many warships have been required. Another reason for so large a navy is the fact that the British Isles are cut off from all other nations by water. They must, therefore, rely rather upon warships for defence than upon a standing army.

Further than this, the British are actually forced to own many ships. Here are over forty million people living on two small islands, from whose soil it is impossible to obtain the necessary food. They must send ships away for their flour, meat, sugar, coffee, etc.;

and they must send abroad for much of their raw material for manufacture. Also in order to pay for the raw materials and food, their manufactured goods must be shipped to all parts of the world; otherwise their extensive manufacturing would be impossible.

These facts show why a very large number of vessels must be employed; and there are two reasons why the British, rather than other nations, should own them. In the first place, such trade is profitable. In the second place, when they own their own vessels they can send them where they will, and are, therefore, independent in case of war.

These facts, coupled with the remarkable energy of the British, are the principle reasons why the United Kingdom greatly surpasses all other nations in the number of her warships and merchant vessels. To illustrate the immense importance of the shipping interests of Great Britain it may be stated that every day in the year there are said to be fully a thousand ships entering her ports.

Few persons appreciate the magnitude of a single large steamship, or its carrying power and cost (Fig. 389). Measure off a distance out of doors as long as that steamship. Compare it with the length of an ordinary freight car. This vessel is able to accommodate about 2000 persons besides a crew of 500 and an enormous amount of freight in addition. It cost $2,500,000 and consumes 500 tons of coal a day.

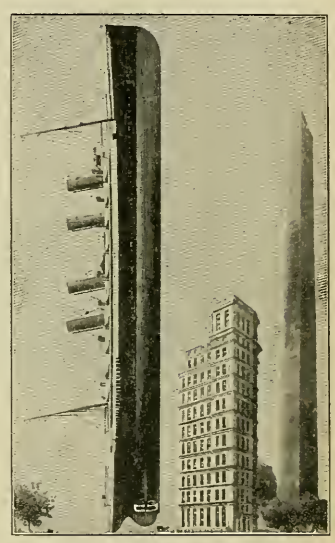


FIG. 389.

A large German steamship which stops at Southampton; to show its great size in comparison with a high building in New York City and with the Washington Monument (555 feet high). The length of this steamer is 648 feet, its width 66, and its depth 43 feet.

Government.— The government of the United Kingdom is a limited monarchy, the present ruler being King Edward VII. We know that in the United States our general laws are made at Washington by a Congress composed of a Senate and a House of Representatives. In the United Kingdom the law-making body corresponding to this

is called *Parliament.* It is likewise composed of two bodies, the House of Lords and the House of Commons.

The *House of Lords* is made up of men with inherited titles who are not elected by the people. In former times the Lords were so powerful that the people had little control of the government; but for many generations their power has been restricted, and the *House of Commons,* whose members are elected by popular vote, is now by far the more important. Through them the people are able to make their own laws, and the government is therefore one of great freedom.

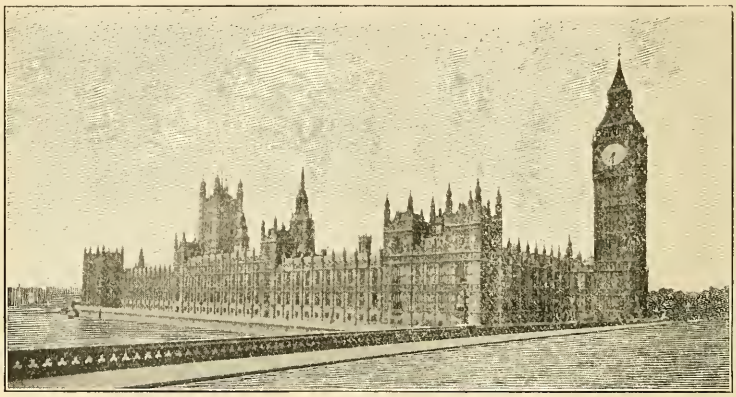


Fig. 390.
The House of Parliament.

While the sovereign is nominally the executive, like our President, the execution of laws is really in charge of a *Cabinet* composed of a *Prime Minister* and several other *Ministers,* who are responsible to the House of Commons for their actions. If the Ministers lose the support of the House, they are obliged to resign; and then others are appointed who will carry out the wishes of the people.

Review Questions. — (1) Give the location and area of the British Isles. (2) What noteworthy facts about their importance? (3) What about the inhabitants? (4) Tell about their climate. (5) Their physiography. (6) The effects of the ice sheet. (7) The coast line. (8) Why is so much of the land in grass? (9) Tell about the live stock. (10) What crops cannot be raised? Why? (11) What are the principal farm products? (12) What disadvantage do the people suffer in regard to food supply? (13) Give the principal facts about the fishing industry. (14) What metals are found in small quantities? (15) How about the abundance of coal and iron ore? (16) Locate the chief coal fields in

Great Britain. (17) Tell about the iron ore in Great Britain. (18) Name other important mineral products. (19) Give reasons for the development of textile manufacturing in Great Britain. (20) What cities are especially noted for the manufacture of woollen goods? (21) For cotton? (22) Tell about the manufacture of iron and steel goods. (23) What about the farm products of Ireland - What about minerals there? (24) About manufacturing? (25) What is used for fuel? (26) Tell about the linen industry of Ireland? (27) About the population. (28) Name and locate the cities in Great Britain that are distinguished for manufacturing. (29) Name and locate the principal coast cities. (30) Tell about London: its location, principal kinds of business, etc. (31) What noted places are near by? (32) Tell about each of the other cities mentioned. Locate each. (33) Give some reasons why the British Isles have more colonies than any other country. (34) Why more foreign trade? (35) Why the greatest number of vessels? (36) Tell about their government.

Suggestions. — (1) On a sketch map of Great Britain mark the position of the highlands and lowlands. (2) Considering the prevailing winds, which side of the great cities must be most free from smoke? (3) Why are sheep able to eat shorter grass than cattle? (4) Make a list of goods made out of flax, and place samples in the school cabinet. (5) Write a paper telling in what ways the people of the British Isles and the United States depend on one another. (6) State ways in which New England and Great Britain resemble each other. (7) What names of British cities have you met in your study of the United States? In what portion of the United States are they? (8) Collect pictures of scenes in the British Isles. (9) What books have you read which describe the scenery or the people of these islands? (10) Find out other facts about the large steamships. (11) What advantages do you see in the fact that the British Isles are near the continent, yet separated by water? (12) Read in George Eliot's "Silas Marner" for a description of old-fashioned manufacturing by hand looms. (13) Also in "John Halifax, Gentleman," for an account of the introduction of steam into the factories. (14) Read Gray's "Elegy Written in a Country Churchyard." (15) Read Scott's "Kenilworth." (16) Find out some facts about Queen Victoria. (17) What do you know about Shakespeare?

For reference to books and articles see Teacher's Book.

III. THE NETHERLANDS AND BELGIUM

Map Questions (Fig. 399). — (1) Compare the area of the Netherlands with that of Belgium; with that of Great Britain. (2) Compare the coast lines of the Netherlands and Belgium. (3) What large river crosses the Netherlands? Through what countries does it pass? (4) What countries border the Netherlands? (5) Belgium? (6) Make an outline map of these two countries.

The Netherlands (Holland)

Physiography. — Figure 391 shows the Netherlands to be a peculiar country. The greater portion is very low, and some parts are as much as fifteen feet below sea level. In fact, if protection against sea and river were not provided, about one-half of the surface would be occasionally or permanently under water. This explains why the country, sometimes called Holland, is more commonly known as the *Netherlands*, a word meaning *low country*.

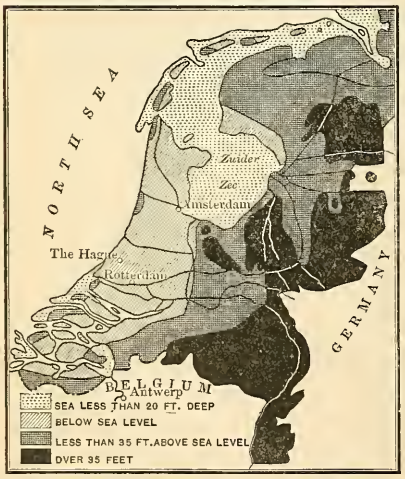


Fig. 391.

Map to show the portion of the Netherlands that is below sea level.

The Rhine has brought much of the soil, some of it, no doubt, all the way from the Alps. A large part of the country is, in fact, a delta of sand and clay built by the Rhine, and it is so low and level that over much of the surface the only notable elevations are either sand dunes, thrown up by the wind, or glacial moraines of sand and gravel. In Figure 367 notice how far the ice sheet reached in this section. Hard rocks are found only in the eastern and southeastern parts, where the highest point is a little over a thousand feet.

In so level a country there can be little water power; and little mineral wealth may be expected in the soft clays and sands. Some iron is found in the bogs, which are extensive, and a small amount of coal is mined in the extreme southeast. Under the circumstances, is there promise of much manufacturing?

Owing to all these disadvantages the Netherlands might seem to be incapable of supporting a large population. Nevertheless that country has about two-thirds as many inhabitants as the remarkably productive state of New York, which is four times as large.

People and Government. — Perhaps the leading explanation of this prosperity is the high character of the *Dutch* people, as the Netherlanders are called. For centuries they have felt an intense love for civil and religious liberty; but, being a small nation, they have suffered many hardships in attempting to establish independence and tolerant laws. At one time they were under German control; later they came under the cruel rule of Spain; but finally they obtained their independence, and their form of government is now a limited monarchy.

While their belief in freedom brought them untold suffering, it was a cause of progress as well. It was to Holland that the Pilgrims first fled when religious persecutions drove them from England; and from time to time large numbers of Huguenots, Germans, and others found refuge there. These immigrants, who were persecuted and driven from home because of their advanced ideas, have nearly always been among the most enlightened people of Europe. Their settlement in the Netherlands therefore had a great influence on the intelligence with which Dutch industries were developed.

Agriculture. — Agriculture, including grazing, is the principal industry of the kingdom, although, largely on account of swamps and sand dunes, a fifth of its area is waste land. The principal farm products are grains, such as rye, oats, wheat, barley, and buckwheat; also potatoes, sugar beets, beans, peas, and flax. More land is devoted to pasturage (Fig. 392) than to these crops, partly because much of the higher land is too sandy for cultivation, and partly because the moisture in the lowlands aids in the growth of

excellent grass. Cattle, hogs, sheep, and horses are raised in great numbers; and quantities of butter and cheese are made.

There is, of course, good reason why the Dutch have been willing to endure the labor and danger involved in reclaiming large tracts of land from the sea. As the population increased, and the need of new farm land grew, it was found possible to keep the high tides and rivers from overflowing the salt marshes and flood plains. In this way the people have added large areas of fertile land, and have also been encouraged to undertake the even more difficult task of reclaiming the shallow sea bottom.

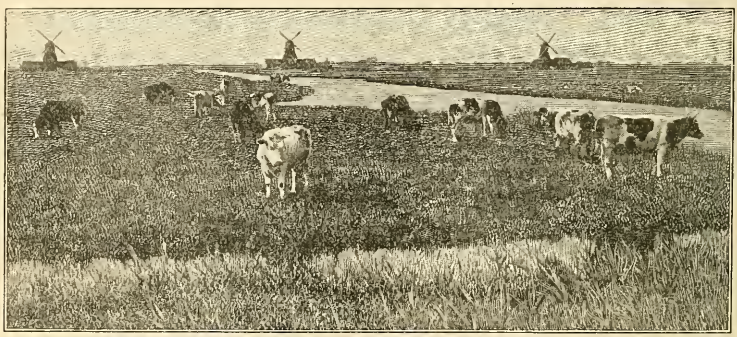


Fig. 392.

A farm scene on the plains of Holland.

Such drainage began in the twelfth century and has continued until the present day. It has already about doubled the area of the Netherlands, and now a scheme is under way to reclaim the Zuider Zee itself (Fig. 391).

The ditches for draining the land really form canals, which, by means of their embankments, enclose houses, gardens, and fields, much as fences or stone walls enclose houses and gardens in other countries. They are so numerous that they extend over the lowlands in a great network.

Manufacturing. — Although there is very little coal or water power in the kingdom, there is an abundance of coal near by in Belgium, Germany, and England. Accordingly, since the people require quantities of cloth, shoes, machinery, etc., they import coal and many of the necessary raw materials and manufacture for themselves. The strangers who fled to the Netherlands to escape

persecution did much toward developing early manufacturing, and this industry now ranks next in importance to agriculture.

Commerce. — Commerce is highly developed for several reasons. In the first place, the ditches, built primarily for purpose of drainage, are also valuable as canals; and these, together with the rivers, make transportation by water very easy to all sections of the country. The flat-topped dikes also make excellent wagon roads; and the level nature of the land renders the construction of tramways and railways a simple matter. Many of the railways connect directly with the European trunk lines.

FIG. 393.
A Dutch windmill.

In the second place, the *position of Holland* gives her a distinct commercial advantage. The Netherlands lie directly in the path of entrance to northern Europe, and the country is crossed by the Rhine River, which is navigable for a long distance into Germany. Therefore much of the American and British trade with central Europe is carried on through Holland.

Colonies. — The Dutch colonies (Fig. 416) furnish a third reason for an extensive development of commerce. Since the very earliest times the Dutch have been in close contact with the salt water. Not only have they battled with the sea in reclaiming land, but to visit some of their near neighbors they have been obliged to cross it, Moreover, both the Zuider Zee and the North Sea, near at hand. contain many food fish; and this fact has led to an important development of the fisheries, one of the leading industries of the country.

The men have therefore become expert sailors ; and when discoveries of new lands were being made, the Dutch sailors naturally shared in the explorations and obtained colonies.

The attempt of the Dutch to colonize our Hudson valley was thwarted by the English; but Holland retains possession of other important regions. Of these, Dutch Guiana in South America has already been mentioned (p. 321); but the most important are Java and several other East India islands. The manufacture of raw products from the colonies constitutes one of the principal industries of the coast cities.

The possession of these colonies, Holland's position, her water and rail connections with other countries, and her many canals and

Fig. 394.

A canal in Amsterdam. Notice the peculiar fronts of the Dutch houses.

excellent roads make the transportation of goods an important industry.

Cities. — Amsterdam and Rotterdam are the two principal commercial centres. The former, the largest city in the Netherlands, is about the size of Baltimore. It is connected with the ocean by canal, and is noted for its university and museums, as well as its shipping, manufacturing, and diamond cutting. The rulers of Hol-

land are crowned at Amsterdam, although the royal family resides at The Hague, where the government buildings are situated.

Rotterdam, next to Amsterdam in size, is the great seaport of the Netherlands. Its location near the mouth of the Rhine makes it one of the principal ports for the interior of the continent, and explains why it is the European terminus for some of the great steamship lines from New York and other parts of the world.

Belgium

Physiography. — The surface of Belgium forcibly recalls that of Holland. The land is low and flat in the northern and western parts, and gradually rises and grows more rolling toward the south and east.

However, the highest point in Belgium (2230 feet) is more than twice that in the Netherlands. Instead of being caused by glacial moraines and sand dunes, this highland is a mountainous region, formed by upheaval of the earth's crust (Fig. 395). The weathering of ages, which has worn these mountains so low, has revealed valuable mineral deposits, especially coal and iron, which fortunately occur near together, as in England. Lead, zinc, and silver are also obtained.

Belgium, therefore, possesses agricultural advantages similar to those of Holland, while the minerals secure opportunities for manufacturing far superior to those of the Dutch. These facts help to explain why, although Belgium is even smaller than Holland, its population is one-fourth larger, or about 6,500,000. How does that compare with the population of New York state? Indeed, the small country of Belgium is one of the most densely populated regions on the earth. Figure out the number of inhabitants per square mile and compare it with the number in New York, or in your own state.

People and Government. — Like the Dutch, the Belgians have endured untold sufferings in their long struggle for independence. Their country has been, to some extent, a battlefield for the larger countries or *powers* of Europe; for example, the *battle of Waterloo*,

by which the career of Napoleon Bonaparte was ended, was fought there in 1815. Since 1830, however, the Belgians have been independent. Their form of government is a limited monarchy.

The intelligence of the Belgians is of the highest order. Even during the Middle Ages their woollen manufactures were the best developed in Europe, and at various times the kings of England have induced Belgian artisans to move to England for the purpose of improving the factory work. Since the great nations of Europe have declared Belgium neutral

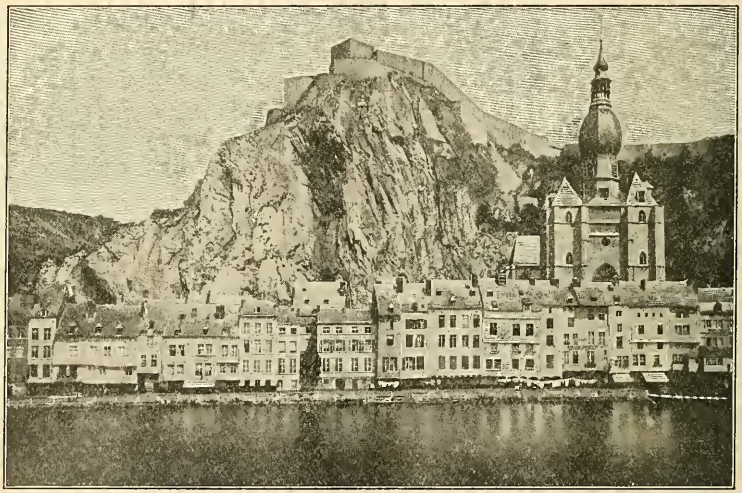


FIG. 395.

A view in the hilly section of southern Belgium.

territory, thus prohibiting further fighting there, the people have found it necessary to keep only a small standing army, and have devoted themselves to the industries. As a result, Belgium has enjoyed a wonderful industrial growth.

Agriculture. — A very small part of Belgium is below sea level; but, as in the Netherlands, much of the country is so flat and fertile that a view on the Belgian plain would closely resemble that in Figure 392. More than half the inhabitants are engaged in agriculture, the chief products, besides live stock, being grain, flax, hemp, fruit,

and sugar beets. Among the farm animals, the Flemish[1] horses are especially noted for their great size and strength.

The Belgian method of farming forms a striking contrast to that in the United States; for instead of ranging from one hundred to several thousand acres, farms in Belgium usually contain not more than two or three acres. To a large extent, spading takes the place of ploughing, and such hand labor, guided by the experience of many generations, secures large yields of the best quality. Flemish flax is the best in the world. In spite of such careful cultivation of the soil much food has to be imported, as in Great Britain.

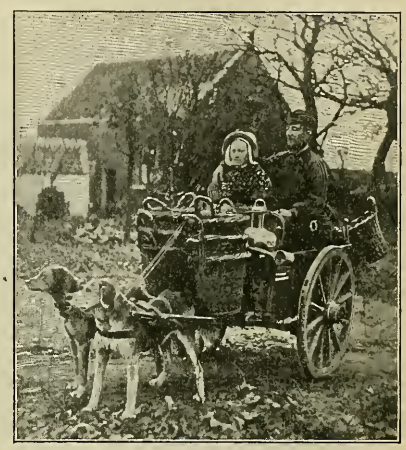


Fig. 396.
A dog team in Belgium.

Mining and Manufacturing. — Quite distinct from the level northern plain, close set with farms and towns, is the hilly region of the southern angle, covered with forests and rich in minerals. More than one hundred thousand men are engaged in mining, and coal and coke are among the leading exports. Around the northwest slope of the hilly region is located one of the world's busiest industrial regions. As in England, the three important kinds of manufacturing; are cotton, wool, and iron and steel. Linen and glass are also made. But the country is so small, and there are so many waterways and railways, — as in the Netherlands, — that coal is transported cheaply to all sections. Manufacturing, therefore, is well distributed, although the coal comes from the south.

Commerce. — By its position Belgium secures many of the advantages that Holland enjoys; that is, it is a gateway to and from the interior of Europe. To be sure, its coast line is only about forty

[1] Derived from *Flanders*, a former country of Europe which included a part of the Netherlands, Belgium, and France. Nearly half the Belgians speak the Flemish language.

miles in length and the water there is shallow ; but ANTWERP has an excellent harbor. There is no large river like the Rhine in Holland, but two smaller streams, rising in France, are navigable for some distance. There is also an extensive system of canals. Besides these waterways, Belgium has more miles of railway, for its size, than any other country ; and the railways are closely connected with the large trunk lines. For these reasons transportation of goods is one of the leading industries in Belgium.

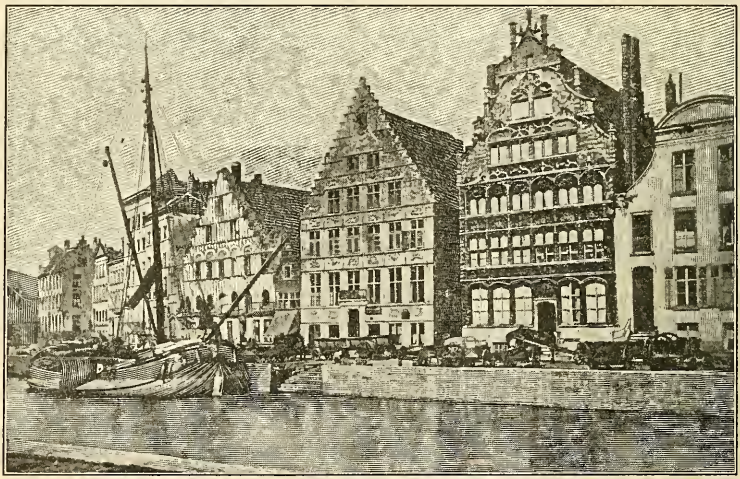


FIG. 397.

A view in Ghent. Notice the peculiar architecture of the houses.

While the Belgians do not possess such valuable colonies as the Dutch, they have been prominent in African exploration. It was the Belgian king who sent Stanley to Africa, and the King of Belgium is sovereign of Kongo State.

Cities. — BRUSSELS, the capital and largest city, situated in the heart of the kingdom, is about the size of Boston. The name Brussels carpets suggests one of its industries ; but carriage and lace making are at present among its most important kinds of manufacture. It is an intellectual as well as a political and commercial centre, having numerous picture galleries, museums, and schools.

ANTWERP, next in size, is situated about sixty miles from the sea, on a small river. Some of the great steamship lines from New York have their European terminus there, and the port is one of the most important in Europe. The leading kinds of manufacturing are sugar refining, distilling, lace making, and shipbuilding.

Many other cities are distinguished for manufacturing. The largest are LIEGE, the "Birmingham of Belgium," engaged in the manufacture of firearms, cutlery, glass, and various kinds of machinery; and GHENT (Fig. 397), noted for linen and cotton goods, and for machinery.

Luxemburg, on the southeastern border of Belgium, is a small duchy governed by a hereditary grand duke and a parliament. Like Belgium, by agreement of the powers of Europe, it is neutral territory. Agriculture, iron mining, and manufacturing are the principal industries.

Review Questions. — THE NETHERLANDS. — (1) Tell about the physiography of Holland. (2) What are the principal mineral products? (3) How does Holland compare with New York in size and population? (4) Tell about the people; the government; agriculture. (5) State reasons for reclaiming the land. (6) What about manufacturing? (7) Give three reasons for the extensive development of Dutch commerce. (8) How have the Dutch come to have several important colonies? (9) Name the principal colonies. (10) Tell about the chief cities.

BELGIUM. — (11) Compare Belgium with Holland as to physiography. (12) Tell about the importance of Belgium; its people and government; its agriculture; its mining and manufacturing. (13) What reasons are there for its important commerce? (14) What about colonies? (15) Locate and tell about each of the cities. (16) What about Luxemburg?

Suggestions. — THE NETHERLANDS. — (1) Why are the winds likely to blow with special force and regularity across Holland? (2) Why is this fact of value to the Dutch? (3) What effect must the winds have upon the rank vapors that rise from the damp soil? (4) What do you know about the flower gardens of the the Dutch? (5) Have you seen any Dutch pottery, especially Delft wares? (6) Why did not the Pilgrims remain in Holland instead of coming to America? (7) Why should not Rotterdam be as large a city as New York? (8) Find out about the Peace Conference of 1899 at The Hague. (9) What reasons are there for selecting a small country like Holland for this purpose, and for making treaties between nations which have been at war?

BELGIUM. — (10) There are greater extremes of temperature in Belgium than in England. Why? (11) Find out some facts about the battle of Waterloo. (12) Give several reasons for spading instead of ploughing land. (13) Examine a piece of lace. From what material is lace manufactured, and how is the work done? (14) Towns in Belgium usually have two names. Why? (15) Would you expect fishing to be as important an industry with the Belgians as with the Dutch? Why?

IV. FRANCE

(For Map Questions, See Map, Fig. 399.)

People and Government. — The early inhabitants of France, called Gauls, were conquered by the Romans (p. 345), who taught them their language and many of their customs. After the fall of Rome, France, like most European countries, was divided into independent kingdoms, which were often at war with one another or with neighboring countries.

The situation of France has, however, tended to bring the kingdoms together; for the country is enclosed on two sides by the sea, and elsewhere, in large part, by mountains. Notice how completely the Pyrenees — which range from six thousand to ten thousand feet in height — separate France from Spain; and notice what a barrier the lofty Alps form along the Italian and Swiss boundaries. Even north of the Alps, a part of the boundary is formed by highlands. While the inhabitants were thus partly protected from invasion, there were few barriers within France itself that kept them apart. It was not difficult, therefore, to bring them under one rule. At present France has a republican form of government.

Fig. 398.

A valley on the French side of the Pyrenees.

Monaco in the southeast, and Andorra in the Pyrenees (p. 392), are the only exceptions. The principality of Monaco, only eight square miles in area, is a noted winter resort because of the fine climate. Its revenue is obtained from the gambling tables at Monte Carlo.

Physiography and Climate. — As we have seen, the chief highlands of France are in the south and southeast. Among these highlands the loftiest are the Alps, whose highest peak, Mt. Blanc (15,781 feet), is in France. Had the mountains stretched along the western coast, the history of France would have been very different. As it is, the prevailing westerlies are allowed to distribute their rain somewhat evenly over the country, supplying all sections with an abundance of moisture for agriculture.

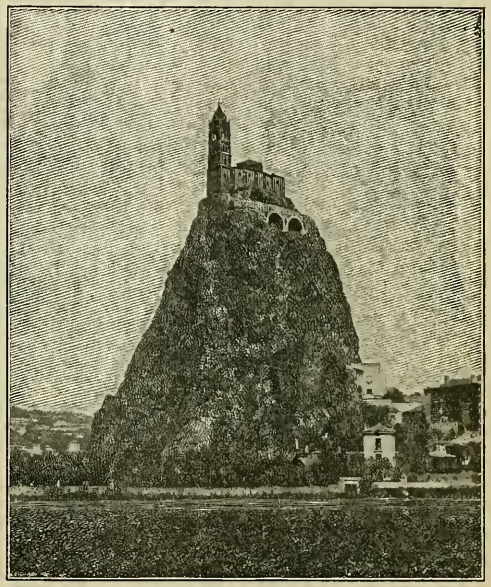


Fig. 401.

A view in central southern France (Monts d'Auvergne on the map). This is a region of extinct volcanoes (Fig. 403), and the church is built upon a steep lava hill.

The position of the highlands is of great importance for commerce as well as for farming. Fully three-fourths of France is a comparatively level plain sloping westward from the low central plateau, which rises steeply as the western wall of the long Rhone valley. All but one of the large rivers rise in this plateau, and flow gently down its slope to the Atlantic. Thus navigation is possible far into the country. Locate and name the three largest rivers. How does the Rhone differ from the other two?

As might be expected, the summers are warmer than in England, since France lies almost entirely south of that country and is less

under the influence of the ocean. The southeastern section, though as far north as Boston, has a semi-tropical climate (Fig. 402), owing to the presence of the warm Mediterranean waters and to the protection from cold north winds afforded by the Alps (pp. 343 and 344).

Agriculture. — France is primarily a farming country, and nearly half the people devote their energies to agriculture, including grazing. The same grains are raised as in England. What are they? (p. 352). Wheat is the most important, and more of this grain is

FIG. 402.

A street scene in Nice (near Monaco), showing the nature of the vegetation in that warm climate. Find out whether Nice is north or south of your home.

produced than in any other European country excepting Russia. Yet France raises only about half as much wheat as the United States, and not nearly enough for the needs of her people. Grapes, not important in the British Isles, thrive in the warmer climate of central and southern France.

Grapes form the most valuable of all French crops, and more are raised in France than in any other country of the world. This fruit, although capable of enduring severe cold, requires a warm summer. The distribution of the vineyards, therefore, shows forcibly the difference between the climates of England and France. Grapes do not mature well in northern France, but they flourish in the warm valleys from the Loire southward.

FIG. 399.

MAP QUESTIONS. — FRANCE. — (1) France is the nearest country to the British Isles. Estimate the distance. (2) Compare the two countries as to area. (3) As

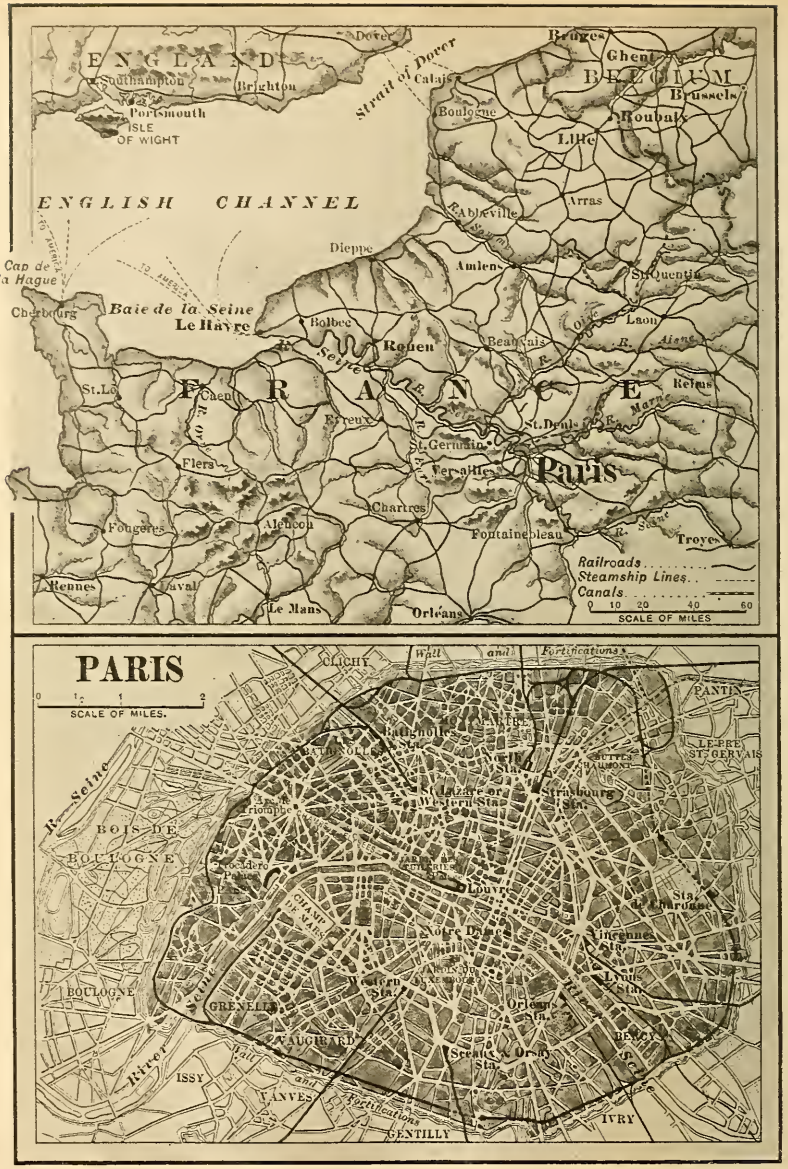


Fig. 400.

To show Paris and surrounding country. Notice how closely the railways follow the stream valleys. Why should they?

The Rhone valley and the Mediterranean coast are further noted for their groves of olive, orange, and mulberry trees. The latter are cultivated for the sake of their leaves, which are fed to the silkworm (p. 385).

As in other countries, the highlands, as a rule, are capable of little cultivation and are usually given over to grazing. Give examples from other countries. As in England, too, there are broad tracts of lowland which are better adapted to the production of grass than to other crops. These facts explain why there are more than thirteen million cattle and twenty-one million sheep in France. What does that signify in regard to manufacturing?

Fig. 403.

A farm scene in southern central France. The mountain peak is an extinct volcano, one of the Monts d'Auvergne (Figs. 399 and 401).

Minerals. — France is quite inferior to the British Isles in its mineral products. Coal is the most valuale mineral; but while Great Britain, after supplying her many factories, exports a large amount of coal, France has to import some. The principal coal beds, from which more than half the output comes, lie close to Belgium. They are, in fact, a continuation of the deposits that were found to be so plentiful in that country. The other beds are small and scattered, but the best of them lie near the centre of the country, not far from St. Etienne. Of what advantage is this location?

The quantity of iron produced is small and comes mainly from the northeast, near the coal fields. Fine clays for porcelain abound in central France, and building stones are quarried in nearly every part.

Manufacturing. — In spite of the limited supply of fuel, France s a great manufacturing nation. Besides silk and wine, in the production of which this country is the leading nation of the world,

there is extensive manufacturing of metal, cotton, and woollen goods. One reason for these manufactures is the fact that coal is easily obtained either in France or from the neighboring countries of Belgium, Germany, and England. Another reason has to do with the nature of the people themselves.

The Frenchman has a peculiar appreciation of what is graceful, delicate, and elegant. This is illustrated by the fact that our fashions in dress originate in France; and a skirt, a pair of gloves, or a bonnet from Paris is expected to be a trifle more desirable than that bought elsewhere. The French have accordingly specialized in this direction; and thus their artistic sense has had great influence upon both the kind and amount of their manufacturing. Their artistic taste is exercised less, however, upon cotton than upon other goods; for the cotton mills are mainly engaged in furnishing simple, inexpensive cloth to the large number of peasants and other poor people.

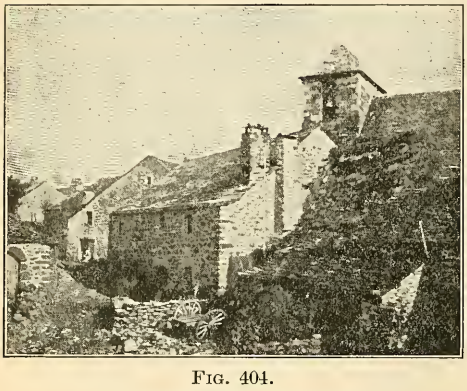


FIG. 404.
A village in southern France.

Wool and Cotton Manufactures. — The northern part of France, including LILLE, ROUBAIX, and REIMS, as well as cities near the mouth of the Seine, is the section especially noted for the woollen industry. Here coal is most easily obtained; and large numbers of sheep are raised on the hills and plains near by. Besides this, foreign wool from Argentina and Australia is easily imported at HAVRE and at the Belgian port of Antwerp. Remembering that the goods turned out — as hosiery, carpets, and underclothing — are of high grade, and such as wealthy people wish, we see that this location, between the two wealthiest capitals of the world, is specially advantageous. Woollen cloths are, next to silk goods, the most important French export to Great Britain.

Cotton manufacturing — mainly for the home market, as indicated above — is also extensively developed near the coal fields of

northern France. An important reason for such work at this point is the ease with which American cotton may be imported; and this explains why ROUEN on the Seine is a prominent centre for cotton goods. There are also cotton factories in eastern France, where water power is used instead of steam power. Why should there be water power in that section?

Silk Manufacturing. — Because the climate and soil of the Rhone valley are adapted to the mulberry tree, and because coal mines are near by, this section is a great silk manufacturing region. LYON is the centre, although ST. ETIENNE and PARIS are also noted for this industry.

The traveller in the Rhone valley sees grove after grove of mulberry trees, carefully cared for in order to supply an abundance of leaves for the silk-worm to eat in summer.

The silk-worm moth, at the end of the caterpillar stage, weaves a cocoon about itself. The material of which the cocoon is composed is a thread, about two miles in length, which must be very carefully unwound. The single strand is such extremely fine silk that, in order to make a fibre strong enough for spinning and weaving, it is united with several others.

Since the worms are reared under cover, the silk industry may be carried on in any climate well adapted to the mulberry tree. It is possible, therefore, to make raw silk in many parts of the world; but the feeding of the worms and the transformation of the cocoons into silk for the market require much labor, care, and skill. On that account silk production is chiefly confined to those parts of the world where laborers will accept low wages, and where, owing to generations of such work, habits of watchfulness and care have been developed. China accordingly produces the greatest amount of raw silk; but France, in the midst of the civilized world where the market for silk goods is greatest, also produces a large quantity and is the leading country for the manufacture of silk. Make as long a list of silk goods as you can.

Other Manufactures. — The extensive cultivation of grapes has been referred to. Much of the wine made from them is consumed at home, for in France even the day laborer drinks wine at his meals in place of or mixed with water. An enormous amount of wine is also shipped abroad. The manufacture of steel goods is important in some places, but to no such extent as in Great Britain. Other kinds of manufacturing are mentioned under the cities.

Paris. — Paris, the capital of France, is the largest city on the continent of Europe and the third largest in the world. It numbers more than 2,500,000 inhabitants.

Location (Fig. 400). — There is a definite reason for the exact site ; for an island in the Seine at that point made the river easier to bridge over, while at the same time it aided in defence. Aside from that, the Seine, having a slower current than the Rhone, and being less subject to overflows than the Loire, is more easily navigable than any other river in France. Its upper tributaries bring it into close touch with eastern France ; and, by the aid of canals,

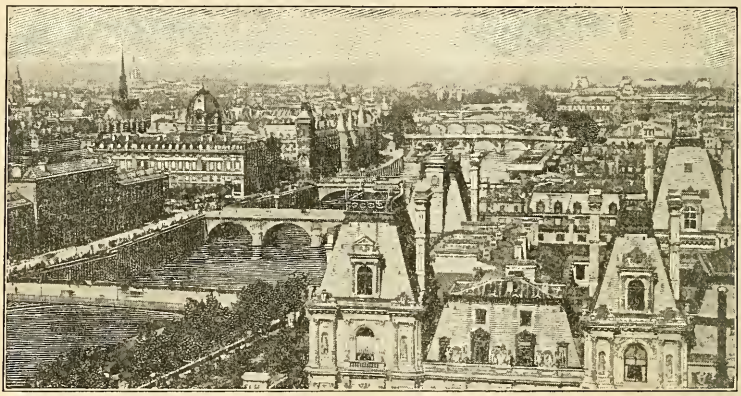


Fig. 405.

A view looking over Paris, with the Seine in the centre of the picture.

there is water connection with the Loire and Saone, and with the Rhine in Germany. Furthermore, Paris is situated on the main trade route from the Mediterranean to northern and central France, which follows the Rhone, the Saone, and the Seine. In addition, Paris is located in the midst of the most fertile portion of the country, and not very far from several other densely populated countries. For these several reasons it has always been the principal French city.

Paris as an Art Centre. — Reference has already been made to the appreciation of grace and elegance characteristic of the French people. Napoleon and other rulers collected art treasures from

various nations, and founded collections and schools which have made Paris famous. The superiority of this city in that respect is recognized in America by the large number of men and women who go there every year for the study of art. It is not strange, therefore, that Paris should be distinguished the world over for its beauty as a city. The wide streets, the beautiful parks with their fountains and statues, and the fine public buildings and old royal palaces, are wonderfully attractive. Even the dwelling houses are in harmony, for it is required by law that new buildings must harmonize with those near by. Therefore one seldom sees an unattractive house in Paris.

Fig. 406.

Statues in the Louvre — the Venus de Melos at the farther end of the hall.

One of the old palaces, known as *the Louvre*, is the most noted art gallery in the world. It contains thousands of works of art, the most celebrated of all being the Venus of Melos (Fig. 406), discovered in 1820 on the little Greek island of Melos in the Mediterranean Sea. Among the paintings, one of the most famous is Raphael's Madonna and Child with St. John, pictures of which are often seen in our country.

Among the many interesting suburbs of Paris is Versailles, where there is another palace that was erected in the days of royalty. It is now mainly used as a museum, and scores of the large rooms are decorated with the finest of paintings. It is among such treasures that the students of art spend much of their time; and it is partly because of the beautiful surroundings that many foreigners reside permanently in Paris.

Manufactures of Paris. — Like other great cities, Paris has too many industries to be specially identified with any one. Yet the superior taste of the Parisians has led them to pay especial attention to the manufacture of articles which combine utility with beauty, such as jewelry, furniture, gloves, fashionable shoes, etc. The Sèvres porcelain is made in the suburbs of Paris, and both this and the Limoges ware, manufactured at Limoges, are celebrated for their beauty.

Commerce of Paris. — Although so far inland, Paris ships more goods by water than any other French city. The extensive canal connections have already been mentioned (p. 386). Vast sums have been spent in dredging the lower Seine, so that the depth of water

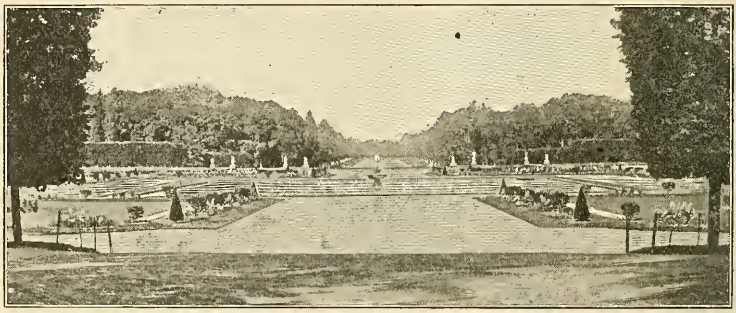


Fig. 407.

Fontainebleau, a beautiful wooded park south of Paris.

between Rouen and Paris now exceeds ten feet. Small vessels can proceed directly to Paris, but larger ships transfer their goods at Havre and Rouen. Besides this, the chief railways of France radiate in all directions from Paris (Fig. 400). All together, therefore, Paris is the political, artistic, manufacturing, and commercial centre of France.

Other Cities. — Havre, which is almost as busy a harbor as Marseille, has an extensive trade in coffee from Brazil, and in wheat and other materials from the United States. Another important port is Bordeaux, on the Garonne River, in the midst of a fertile grape-raising district. It is the chief port for the export of French wines. Locate the cities previously named and tell for what each

is important. Note especially LYON, next to Paris in size, and a little smaller than Baltimore.

The third French city in size, and its leading seaport, is MARSEILLE, which is almost as large as Lyon. The delta of the Rhone is too marshy for a city, and Marseille occupies the nearest point where there is a good harbor and where other conditions are favorable for a town. For many centuries the Rhone valley was the principal gateway from the Mediterranean to much of Europe. One route leads to the Seine valley, and thence to Paris (p. 386), northern France, and Belgium. Another enters Switzerland through Lake Geneva, out of which the Rhone flows; and still a third route leads, through an opening in the mountains, into the Rhine valley and Germany.

Commerce of France. — Notwithstanding the great amount of internal commerce on the numerous rivers, canals, and railways, and notwithstanding the extensive foreign trade, France is not a great maritime nation like the United Kingdom. In fact, her merchant marine is only one-tenth as large as that of the British Isles and three-fifths that of Norway. This is not entirely because of lack of acquaintance with the sea, for there are more French than British fishermen. The small number of good harbors, and the frequent and destructive wars during the last century, are among the reasons why France depends so largely upon other nations, as upon British and Norwegians, for vessels to carry her goods. Why is it safer for her to be thus dependent than for Great Britain?

Colonies (Fig. 416). — On the other hand, France has been extensively engaged in exploration. You will remember that the French formerly had extensive possessions in North America. Where were they? Where are her present possessions in the New World?

In Asia, France holds a part of Indo-China and a very small bit of India; and she has numerous islands in different portions of the world (Fig. 416). But her most important colonies are in Africa, as follows: (1) Algeria and Tunis, across the Mediterranean; (2) a vast area south of these countries, including a large part of the Sahara Desert, the Sudan, the upper Niger, and the country north of the Kongo River; and (3) the large island of Madagascar, east of southern Africa.

Review Questions. — (1) Tell about the early inhabitants; (2) the influence of the boundary line for unity; (3) the government; (4) the physiography and climate. (5) What are the principal farm products? (6) Which of these have been found in Great Britain? (7) Which have not been found there? Why? (8) Tell about the mineral products. (9) Give reasons for the extensive manufacturing. (10) Tell about the woollen manufactures. (11) Cotton manufactures. (12) Tell about silk and silk manufacturing. (13) What about other manufactures? (14) Tell about Paris; its size; location; artistic attractions; manufactures; commerce. (15) Tell about: (*a*) Havre, (*b*) Bordeaux, (*c*) Lyon. (16) What are the reasons for the location of Marseille? For what is it important? (17) What is there peculiar about the commerce of France? (18) Tell about the colonies.

Suggestions. — (1) What is the name of the present President of France? (2) Give reasons why one river, as the Loire, might be much more subject to overflows than another, as the Seine. (3) Examine Figure 367 to see if the glacier reached into any part of France during the Glacial Period. (4) Raise a silk-worm from the egg. (5) Examine a cocoon and see if you can unravel some of its thread. (6) Also unravel a piece of silk goods and examine the threads. (7) What influence on the commerce of Marseille has the construction of railway tunnels through the Alps probably had? (8) The construction of the Suez Canal? Why? (9) See if you can find any porcelain ware from Sèvres or Limoges. (10) What changes might be brought about in your locality if the people there prided themselves greatly on the beauty of the streets, houses, etc., as the Parisians do? (11) What pictures of fine statuary have you seen? (12) Find the names of some of the great French painters. (13) Read some stories from French history; for example, the story of Roland in the days of Charlemagne, when the Pyrenees helped the French to keep the Saracens back; the story of the French Revolution; the story of Joan of Arc, etc. (14) Make an outline sketch of France, with the principal mountains, rivers, and cities. (15) On an outline map of the world, sketch in the French colonies with their names.

For references, see Teacher's Book.

V. SPAIN AND PORTUGAL

Map Questions. (Fig. 399.) — (1) What other cities in the world are in about the same latitude as Madrid? (2) Compare the area of the Spanish peninsula with that of France (Appendix). (3) Compare the populations (Appendix). (4) Compare the directions taken by the rivers. (5) Judging from the map, what would you expect as to the number of good harbors? (6) What has been stated about the temperature and rainfall in Spain? (pp. 342 and 344.) (7) What islands in the Mediterranean Sea belong to Spain?

People and Government. — The people of this peninsula once had much the same rank among nations as is now held by the British.

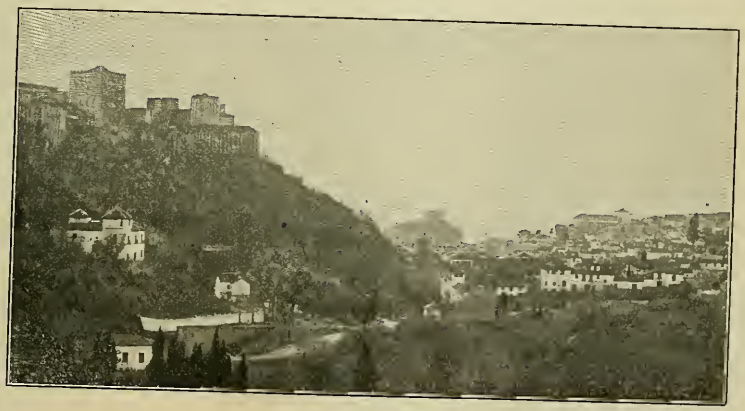


Fig. 408.

The Alhambra, one of the last strongholds of the Moors; — Mohammedans who once conquered and occupied Spain.

Name countries that they controlled. Mention some noted Spanish and Portuguese explorers. Now, however, both Spain and Portugal are classed among the weaker nations of Europe.

The mountainous character of the peninsula has been one important cause for the decline of Spain and Portugal. The various races on the peninsula, cut off from one another by table-lands and moun-

tain ranges, have never been fairly blended into one people. For centuries they were divided into small, independent kingdoms having different languages. Just before the discovery of America, however, most of these states were brought under one rule by the marriage of Ferdinand and Isabella; and later even Portugal was joined to Spain.

But Portugal, which is partly separated from Spain by deep gorges and canyons, soon broke away. Also *Andorra*, a tiny country in the Pyrenees, was never fully conquered and is still independent; and the union of some of the others has been by force rather than by choice. At present the parts of Spain are held together under a limited monarchy, and the same is true of Portugal.

Physiography and Climate. — The key to many important facts about Spain and Portugal is found in the extensive elevation of the land. On the northern boundary stand the Pyrenees, continued on the west by the Cantabrian Mountains, while in the extreme south are the lofty Sierra Nevada ranges. Between these two systems is a broad plateau, from two to three thousand feet in elevation, with numerous short, broken mountain ranges.

In the Ebro valley on the northeast and the Guadalquivir (meaning Great River) valley on the southwest there are lowlands. Point to these rivers on the map. The only other extensive lowland is a narrow strip near the sea, which reaches most of the distance around the peninsula. A very large proportion of the surface, therefore, is made up of plateaus and mountains.

This condition of elevated surface is important, in the first place, in preventing Spain from becoming a great thoroughfare for the transportation of goods. The position of the peninsula, between the two busiest seas of the world, and between Africa and central Europe, suggests that it might be a valuable route for commerce. But the highlands *separate*, rather than unite, these regions.

The highlands have an important influence also on the climate. Owing to the elevation the interior has cold winters, though the summers are hot; and because of the fringe of mountains, the rainfall is light everywhere excepting near the northwestern coast, where the vapor is condensed in rising over the slopes (Fig. 371). The southern portion of Spain, like southern California, being in the

horse latitudes (p. 262), is so arid that agriculture without irrigation is impossible.

There are several other effects produced by the highlands. In the first place, the rivers are unnavigable; for in descending from the arid plateau to the coastal plains their courses are rapid and their volume slight. Besides that, most of them have cut such deep, narrow valleys, like that of our Colorado Canyon, that they are not only useless for irrigation but are even a great hindrance to communication. The Guadalquivir, which has a wide valley and which vessels are able to ascend as far as SEVILLE, is the principal exception.

Since the interior is so arid and rugged, it must have little timber, little agriculture, few people, and few roads, railways, and canals. With one or two exceptions, therefore, the chief towns are to be found along the coast.

Agriculture and Grazing. — In one respect the elevation of the land is an advantage because it insures great variety of climate, and hence many kinds of farm products. What countries of South America does this condition call to mind?

We may expect grazing in the uplands and among the mountains, as in similar rugged and arid regions elsewhere. Name some of them. Spain is noted for the excellent grade of its sheep and mules. There are also many cattle, especially in the rainy northwest; but the fact that so much of the country is arid explains why there are many more sheep and goats than cattle. The sheep often wander about in flocks of ten thousand under the care of a number of shepherds and their dogs. In summer they feed among the mountains, but in winter they are driven down to the more protected lowlands for shelter.

FIG. 409.
A sheep pasture at the Convent of Palos in Spain.

Wheat is the most common crop in Spain, since it requires comparatively little rain; but there is far less than might be, since so many of the Spaniards lack energy and enterprise.

In many of the valleys where irrigation is possible, and especially on the lowlands along the coast, the farmers are more progressive and prosperous. Barley, rye, and corn are raised in addition to wheat, and these are among the staple foods of the people. Quantities of grapes are also grown in Spain and Portugal; and in the southern part of the peninsula the bark of the cork oak is a source of income to both countries.

The arid southeastern coast is wonderfully productive. One reason is the warm climate, due to the influence of the Mediterranean; another is the number of mountain streams, which, though useless for navigation, are extremely valuable for irrigation. Some of the products of this section, besides wheat and corn, are cotton, grapes, olives, figs, dates, oranges, lemons, and rice. Several crops of some products may be raised in a year.

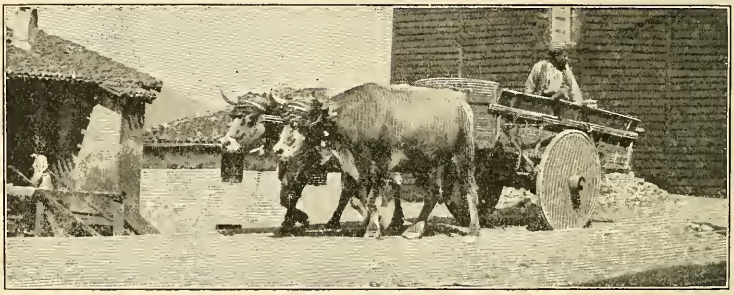


FIG. 410.

A wooden-wheeled ox cart, to illustrate the backwardness of the Spaniards.

Mining. — Spain is remarkably rich in minerals. Lead and silver are mined in the upper valley of the Quadalquivir, and along the southeastern coast. Some distance northeast of SEVILLE a large quantity of *quicksilver*, or mercury, is obtained; and northwest of Seville, and in southern Portugal, are some noted copper mines. Coal and iron ore are found in several parts of the peninsula, but the largest output of each occurs on the northern slope of the Cantabrian Mountains. Spain produces more quicksilver than any other country, and is exceeded only by the United States in the output of copper and lead.

Here, however, as in other industries, the character of the people prevents proper development of the resources. Much of the benefit from the mines is due to the capital and enterprise of foreigners; the English and

French are in control of the copper mines, and the Rothschilds own the quicksilver.

Manufacturing. — From what has been said above it is apparent that manufacturing cannot flourish. This fact is all the more evident when we consider that more than two-thirds of the Spaniards, and three-fourths of the Portuguese, cannot read. Thus, although they have coal beds, much of their iron ore, instead of being smelted at home, is shipped to the coal fields of Swansea in Wales to be smelted. In some places, however, as will be seen in our study of the cities, there is manufacturing of certain kinds.

Principal Cities of Spain. — MADRID, the metropolis and capital of Spain, is nearly as large as Baltimore; but unlike most other large cities so far studied, it is not an important manufacturing centre. Why not? The explanation of its size is found in its central location, and the fact that it is the seat of government. In crossing the peninsula to connect the coastal cities, all the principal railway lines converge at this point, and thus Madrid has become the intellectual and political centre of the country.

FIG. 411.
A Spanish bull fight.

To some extent, Madrid, with its wide streets, magnificent royal palace, and one of the finest art galleries in the world, recalls the attractions of Paris. But one of its most frequented places is an enormous building, which seats many thousands and which is used for bull fighting. In its indulgence in this brutal sport the city bears no resemblance to Paris; nor is there any resemblance in its surroundings. From the streets of Madrid one looks across the country for miles and miles, seeing not a tree nor fence nor house; only the weeds and scattered vegetation of an arid waste.

The city next in importance upon the highlands of Spain is GRANADA, the last stronghold of the Moors. To this point among

the mountains, at the intersection of the best routes of travel from east to west, and from north to south, these people withdrew. Here they maintained themselves for two hundred years and developed a city of four hundred thousand population. At present, Granada contains less than one-fourth as many inhabitants, and its principal attraction is the Moorish palace, or Alhambra (Fig. 408), one of the finest examples of Moorish architecture in existence.

On the lowlands west of Granada are SEVILLE and CADIZ, both flourishing cities at the time when vast stores of plunder were being brought from the Spanish colonies in the New World. CADIZ is now a fortified

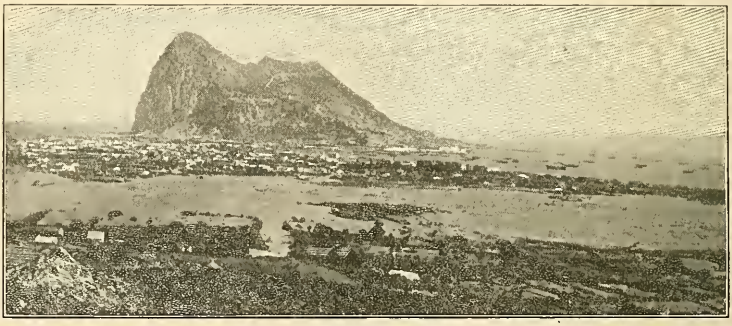


FIG. 412.

The rock of Gibraltar from the Spanish coast, showing the narrow neck of land which connects it with the mainland.

naval harbor; and SEVILLE is recovering a degree of her former commercial importance. One tobacco factory in Seville employs about five thousand women in making cigars and cigarettes.

Gibraltar, a steep hill, with bold cliffs rising on nearly all sides, and with a town at its base, has belonged to England since 1704. This rock hill (Fig. 412) is, perhaps, the strongest fortification in the world, and guards the entrance to the Mediterranean. Why should the English especially want such a stronghold there?

Malaga grapes serve to remind us of the coastal city by that name, and of the products about it. It has one of the warmest climates in Europe; and in addition to grapes, such semi-tropical fruits as olives, dates, and lemons are cultivated in its vicinity. MALAGA has a poor harbor, but good roads lead northward from this point over the mountains, and it is a point of export for wine, raisins, and fruits.

Valencia and Barcelona are the leading seaports of Spain. The region about the former is a beautiful garden, much like southern California, which it resembles also in products. Name some of the products. In addition, rice, one of the staple foods, is grown on the lowlands near the coast. Barcelona, the second Spanish city in size, is the principal seaport and an important textile manufacturing centre as well.

On the whole Spain is poorly provided with harbors; and while the majority of the people dwell near the coast, and many engage in fishing, they take a small share in international commerce.

Colonies of Spain. — The only remnants now left to Spain of her once magnificent foreign possessions are for the most part in Africa. These include a few small settlements on the coast of Morocco; a portion of the western coast of Sahara, having little value; and a few small islands in the Gulf of Guinea. The Canary Islands west of the northern coast of Africa and the Balearic Isles in the Mediterranean also belong to Spain.

Principal Cities and Colonies of Portugal. — Lisbon and Oporto are the chief cities of Portugal. The former, the capital and

Fig. 413.

The harbor and city of Oporto. Describe the situation of the city.

metropolis, lying on a broad bay where the Tagus River enters the sea, has one of the finest harbors in the world. With its white houses, its cathedrals and palaces — all partly buried in trees on the hillsides surrounding the harbor — it vies in beauty with the most attractive cities in the world.

The misfortunes of Lisbon have been many. It has suffered from sieges, plagues, and earthquakes. The most terrible catastrophe happened in 1755, when an earthquake, followed by fire, destroyed most of the houses and a large part of the population.

Oporto gives the name to Port wine. The lower part of the Douro valley is one of the richest wine districts in Europe, and Oporto, like Bordeaux, is an important point for its export.

Portugal, like Spain, has lost much of her foreign territory. The Azores Islands, far to the west in the Atlantic, and the Madeira Islands, to the southwest, are a part of the kingdom. A number of the Azores Islanders have settled in Gloucester and other fishing centres of New England, where they are among the most successful fishermen. Why should they be thus skilful? The Cape Verde Islands, also a volcanic group, off the coast of Africa, are treated as dependencies. Portugal also has large possessions on the mainland of Africa and smaller ones in Asia.

Review Questions. — (1) Tell about the people and government of Spain and Portugal. (2) Describe the highlands of the peninsula. (3) Mention several consequences of this elevated condition of the land. (4) Tell about agriculture and grazing. (5) Tell about the mining. (6) What can you say about manufacturing? (7) Give the main facts about the following cities: (*a*) Madrid, (*b*) Granada, (*c*) Seville, (*d*) Cadiz, (*e*) Malaga, (*f*) Valencia, (*g*) Barcelona. (8) For what is Gibraltar noted? (9) What about the colonies of Spain? (10) Tell about (*a*) Lisbon, (*b*) Oporto. (11) What about the colonies of Portugal? (12) Name and locate the principal cities of Spain and Portugal.

Suggestions. — (1) About what portion of the boundary line between Spain and Portugal is formed by rivers? (2) What must be the influence of railways upon the old-fashioned methods of farming in the interior? (3) Recall the Spaniards' treatment of the Incas in South America. (4) Look in the report of the Twelfth Census to see what per cent of our population cannot read. (5) Read about the great fleet, called the Spanish Armada, that was once sent out to conquer England. (6) Find out about some events in our recent war with Spain. (7) Learn what is meant by the Pillars of Hercules. (8) Find other pictures of Moorish architecture. (9) Read Washington Irving's "The Alhambra." (10) Make a sketch of the Spanish peninsula, including the principal rivers and cities.

For References, see Teacher's Book.

FIG. 414.

Some of the few wild animals of Europe. Domestic animals are abundant, including the reindeer of the tundras. Even the bear is tamed and exhibited. Have you ever seen one of these European bears preforming on the street?

FIG. 415.

MAP QUESTIONS, NORWAY, SWEDEN, AND DENMARK. — (1) The Scandinavian peninsula is the largest in Europe. What is its length in degrees? In miles? (2) How does its western coast remind you of the western coast of Scotland and Ireland? (3) What evidences do you see of glacial action? Where? (4) What do you observe about the rivers.

of Sweden? (5) Which of these three countries has the largest population? (6) How does it compare with New York State in area and population? With your own state? (See Appendix B.) (7) Make the same comparison for the smallest of the three countries. (8) What points in North America are in about the same latitude as Bergen, Christiana, and Stockholm? (9) On Figure 318 find how near to Scandinavia the Gulf Stream drift reaches.

FIG. 416.

Possessions and dependencies of the United States, France, Germany, and the Netherlands.

VI. NORWAY, SWEDEN, AND DENMARK

(For Map Questions, see map, Fig. 415.)

People. — The people of these three countries have long been more or less united, for the well-settled southern portions of Norway and Sweden are not separated by any natural barrier, while only a narrow, shallow sea separates Scandinavia from Denmark. Being descended from a common stock, and at times having a single government, they have many interests in common. The written language of the Norwegians and Danes is still the same, and Norway and Sweden are united under one king, although they have separate local government. Denmark is now independent, and, like Norway and Sweden, is a limited monarchy.

These people have been closely connected with our own history, for they made some of the early invasions and settlements in Great Britain, and are thereby to be numbered among our ancestors. Their daring seamen reached Greenland, by way of Iceland, and discovered America nearly five hundred years before Columbus approached its shores. In the present century they have migrated to the United States by thousands, and have chosen homes in many states, but particularly in Minnesota, Illinois, and Wisconsin.

Physiography and Climate. — There are only about one-fourth as many inhabitants in these three countries together as there are in the British Isles ; yet in spite of frequent European wars, they have preserved their independence through many centuries. This has been due in part to their peculiar position. The only land approach to Scandinavia is by way of Lapland in Russia, which is so far north that it is very cold. Thus the peninsula is almost as isolated from other nations as is Great Britain.

Denmark, on the other hand, is partly connected with Germany. However, the most important parts of Denmark, the islands, are

completely separated by water. These islands and the Danish peninsular (Fig. 439) are the higher portions of a lowland that were left projecting above the water when sinking of the land changed the Baltic valley to a shallow sea (p. 339). Standing at the entrance to the Baltic, they guard the approaches to this inland sea, and naturally Germany, Russia, and other nations have long coveted them. But as neither of the Great Powers was willing that one of the others should hold them, little Denmark has been allowed to continue its independent existence.

Fig. 417.
A Norwegian fjord with steep cliffs rising from the very water's edge.

The rugged surface and severe climate of Scandinavia have also served as a protection against invaders. From its southern to its northern end the peninsular is mountainous. It is an ancient mountain land (p. 338), much worn, and cut by deep stream valleys. While some peaks reach an elevation of six to eight thousand feet, most of them are lower and of so nearly the same height that the upland resembles a plateau when viewed across the mountain crests. The boundary between Norway and Sweden follows the divide between the east and west flowing streams ; and since the mountains descend steeply into the ocean on the western side, those streams which flow toward the west are the shorter. Therefore, in all but the southern part, Norway is a narrow, mountainous region crossed by short streams flowing in deep, steep-sided valleys (Fig. 417).

Agricultural Districts. — The mountainous surface and cold climate are unfavorable to agriculture, although the warm ocean waters (p. 342) exert an enormous influence here, as in the British Isles. In rising over the mountains, the westerly winds supply abundant rain and snow, and it is the later which causes the numerous glaciers.

Since the slope on the eastern side is much the longer, Sweden has extensive lowlands throughout its length. But these lowlands are so far north, and so protected from the influence of the sea, that in all but the southern part agriculture is of little importance.

FIG. 418.

Bergen, Norway, with its deep, narrow fjord harbor.

Although Denmark is free from mountains, the northern and western portion of the Danish peninsula (called Jutland) is a sandy waste, so that only the islands and the southeastern part of the peninsula are very productive.

In these three countries, therefore, there is a comparatively small area that is valuable for agriculture, and the sections lie near together; namely, in southern Norway and Sweden and in eastern Denmark.

Industries and Cities of Norway. — Since less than four thousand (out of a total of one hundred and twenty-five thousand) square miles in Norway have a soil and climate adapted to agriculture or pasturage, the amount of stock and grain produced is small.

Therefore, much meat, flour, and other food must be imported. Also, while there are some silver and copper mines, coal is entirely lacking, because the rocks were formed before the Coal Period. Manufacturing, therefore, is little developed. Even the fine water power is little used, because raw products for manufacturing are not abundant.

On what, then, do the two million inhabitants depend for a living? They have two valuable resources, — lumber and fish. More than one-fifth of the country is forest-covered — pines being most

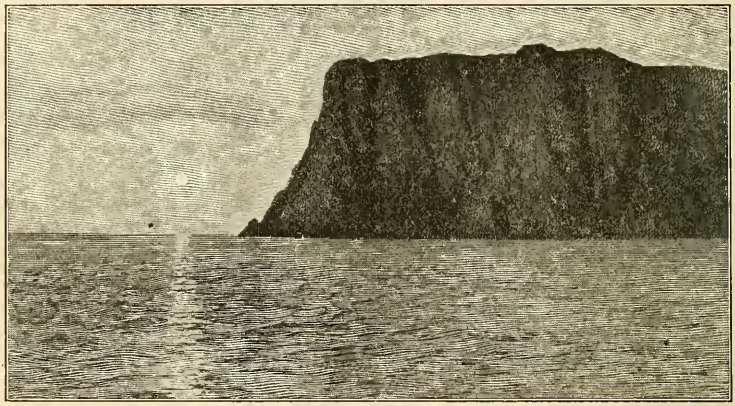


Fig. 419.

North Cape, the northern point in Norway. The summer sun is shining here at midnight, because the cape is within the Arctic Circle.

common — and lumber, wooden goods, and paper are the most important exports. As in Maine, the rapidly flowing rivers are of use in moving the logs from the forest, and also in supplying power for the sawmills and planing mills.

Fish abound on the shallow banks along the irregular western coast, especially codfish in the neighborhood of the far northern Lofoden Islands. The North Sea with its many fish is also close at hand, and the Arctic Ocean with its seals and whales. Over a hundred thousand Norwegians are engaged in the fishing industry. Along the fjords every family owns a boat, and knows how to make

as well as use one. While the men are at sea the women work the small farms or garden patches.

The abundance of lumber and the love for the sea, developed through centuries of experience in navigating the deep fjords and in fishing, have given rise to a third great industry, that of carrying goods for other nations. The timber for wooden vessels is easily supplied, and this small Norwegian nation has at present a greater *number* of freight vessels than any other European country excepting the British Isles.

These facts help to explain why the Norwegian towns are found along the coast. Indeed, it is rare to find even a village in the interior. The two principal cities are CHRISTIANIA, the capital and largest city, and BERGEN (Fig. 418). The former is situated at the head of a long, narrow, sunken valley, or fjord, which makes an excellent harbor, and the city is the principal port and distributing centre for southern Norway. Bergen is the important fishing port, as Aberdeen is in Scotland and Gloucester in Massachusetts.

Scenery on the Western Coast. — As in the British Isles and northeastern North America, the sinking of the Scandinavian peninsula has caused the sea to enter the river valleys, forming many bays, peninsulas, and islands. It is estimated that there are fully ten thousand islands along the coast of Norway. Owing to the fact that, before the sinking took place, the river valleys were deeply cut in hard rock, the bays are usually long, narrow, and deep fjords (Fig. 417).

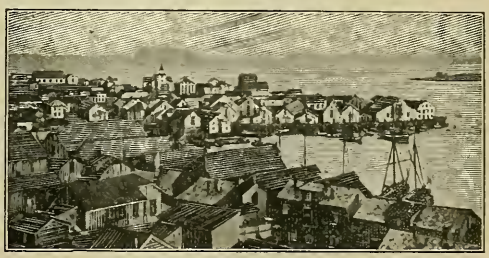


FIG. 420.

Hammerfest, Norway, far within the Arctic Circle. This town is the nearest to the pole of any in the world excepting Upernivik in Greenland, where all but a few of the inhabitants are Eskimos.

Some of the fjords extend fully ninety miles inland, and swollen streams from the mountains frequently plunge, for a fall of a thousand feet or more, over the vertical cliffs which bound the fjords. The cliffs are often only barren rock; but here and there, where the slopes are not too steep, green forests cover the surface; glaciers are frequently in sight; and occasionally, upon a level patch, a hamlet of fishermen's homes

(Fig. 370) is seen. These hamlets are usually upon the deltas of small streams and are connected with the outer world, and with other villages, by no road or pathway excepting the waters of the fjord. So isolated are these hamlets that each man must learn to do many things, — farm, fish, tan his leather, make his shoes, build his boat, his house, etc.

Hundreds of visitors from all parts of the world travel by steamer along this coast every summer to enjoy the beautiful scenery. Another attraction is the sight of the sun at midnight (Fig. 419). At Bergen, Christiania, and Stockholm, which are in nearly the same latitude, the shortest night is less than six hours; at Trondhjem it is about four; and at Hammerfest (Fig. 420), far within the Arctic Circle and near North Cape (Fig. 419), the sun does not set from May 13 to July 29.

Industries and Cities of Sweden. — Agriculture is the leading industry of Sweden, for fertile soil, swept by the glacier (Fig. 367) from the northern and western highlands, has been scattered over the lower lands. In consequence, the southern part of the country presents much the same appearance as New England. Oats are raised in most abundance, but rye, barley, wheat, and potatoes are also produced. One reason why these products can mature here is the absence of cool summer winds from the ocean; another is the great length of the summer days in this far northern latitude. Much live stock is also raised, and butter is exported to Great Britain.

However, nearly one-half the area of Sweden is covered with forest, and lumber is by far the greatest article of export, as in Norway. Indeed, these two countries supply much of the lumber needed in western Europe. Their wood is especially valued because of its hardness and durability — qualities that are due to the closeness of the annual rings caused by the shortness of the summer season.

Mining is the third important industry. There are silver, lead, zinc, and copper mines. Some coal is found in the southern end, and the country has long been noted for its excellent iron ore. But since the principal iron mines are located far from the coal, there is little iron manufacturing in Sweden. However, as in portions of the Lake Superior district of the United States, some of the iron ore is smelted by the use of charcoal, and some by coal mined in Sweden or brought from other countries. The Swedish iron is of such excellent quality

that it is eagerly sought where the highest grade of steel tools is manufactured, as in Sheffield, England.

Sweden possesses excellent water power for various kinds of manufacturing, and in recent years the numerous rivers have begun to be utilized, so that manufacturing is making rapid progress there.

The two principal cities — STOCKHOLM, the capital, and GOTHENBURG — are on the coast; but there are other small seaports and

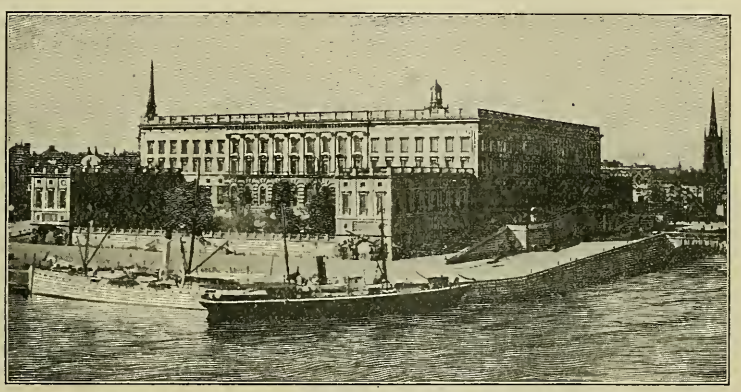


FIG. 421.
The royal palace at Stockholm.

inland mining towns. Stockholm is the residence of the king of the united countries, who is also required to spend a part of each year in Norway. The situation of this city is one of marvellous beauty, on an excellent harbor; but unfortunately it is blocked with ice for four months each year. Owing to the numerous lakes and to canals, it is connected by water, as well as by rail, with the chief points in a populous region, and is therefore the principal distributing centre for imports. Gothenburg, the chief centre for exports, possesses the important advantage that its harbor is seldom frozen over. It is connected with Stockholm by railway as well as by lake and canal. Much of the distance between these two cities is occupied by lakes.

The principal foreign trade of both Norway and Sweden is with Great Britain. Give reasons for this. What must be the main articles of import and export? Next to Great Britain comes Germany. Can you suggest reasons for this?

Industries and Cities of Denmark. — There is neither coal nor metal in the rocks of Denmark, so that there is no mining in the country. The only mineral product of value is clay, well suited to the manufacture of porcelain, which is an important industry. As in Ireland, the lack of coal for fuel is partially met by peat from the bogs and swamps of the northern and western parts.

The fact that butter constitutes one-half the exports of Denmark throws much light upon the principal occupation of the people. Farming, especially dairying, is the chief industry ; and in this small country there are a million and a half dairy cows and nearly as many sheep, besides many horses, goats, and pigs. The laws of the nation discourage large farms, so that each farmer, by carefully cultivating a small patch of land, as in Belgium, obtains the most that it can yield.

Fig. 422.
A view in Copenhagen.

The nearness to good fishing banks has naturally made fishing important ; and this, together with the influence of island life, has created such a love for the sea that large numbers of Danes serve as sailors on British and other foreign vessels.

As in the case of Norway and Sweden, the principal foreign trade of Denmark is with Great Britain. Why? What goods can well be exchanged? One might therefore expect an important seaport on the western coast ; but that coast is so low, and so shut in by sand bars, that good harbors are lacking. In fact, the only harbor in all Denmark that admits large vessels is Copenhagen (merchants' harbor) on Seeland Island. Since this point guards the entrance to the Baltic Sea, there is a double reason why Copenhagen is the principal city of Denmark. The fact that it is the capital also increases its importance. While it approaches Buffalo in size, the next largest city is only one-tenth as populous.

Colonies of Denmark. — The Danes, even more than the Norwegians, have been daring seamen and explorers of foreign lands. Although some of their possessions have been lost, Greenland, the Faroe Islands, and three small West Indian Islands are still Danish colonies; and Iceland is a Danish dependency. In the *Faroes*, consisting of a score of small islands north of Scotland, the principal products are sheep and fish. Why might you expect these two particularly?

Iceland, which is larger than Ireland, and more than twice the size of Denmark, is an island of volcanic origin. Over a hundred volcanoes are found there, twenty-five of which have been in eruption during historic times. Mt. Hecla is one of the most noted of these. Destructive earthquakes are common, and there are also geysers similar to those found in our Yellowstone National Park. The interior is a desert plateau, for the most part covered with snow, and hence uninhabited. Near the sea, however, there is some good pasture land, and the people are principally engaged in raising cattle and sheep. Fishing is important, and down from the eider duck is a valuable product.

Review Questions. — (1) What about the people of these three countries? (2) Describe briefly the surface of Norway; of Sweden; of Denmark. (3) Where are the principal farming sections? (4) Tell about agriculture in Norway. (5) Why is there little manufacturing there? (6) What is the principal export? Why? (7) What about fishing? (8) Give reasons for the large merchant fleet of Norway. (9) Tell about the cities of Norway. (10) Describe the scenery on the western coast. (11) Tell about Sweden: principal industry; forests; mining; manufacturing; principal cities. (12) What are the industries in Denmark? (13) Tell about Copenhagen. (14) Tell about the foreign territory of Denmark. (15) What are the important facts about Iceland? (16) Give reasons why Norway, Sweden, and Denmark have their principal foreign trade with the British Isles.

Suggestions. — (1) Why should the telephone prove of special importance among the fishing towns scattered along the coast of Norway? (2) By use of a globe explain why the sun does not set for weeks at a time at Hammerfest. (3) Why is the whale and seal fishing important as a means of furnishing light during the long night of this northern land? (4) What do you know about the life of the Laplanders? (5) Why should Bergen be one of the rainiest cities of Europe? (6) Give reasons why harbors on the Baltic should be blocked by ice much oftener than those on the western coast of Norway. (7) Can you give a reason why so many matches should be made in Sweden? (8) Give all the reasons you can to explain why the Norsemen should have become such daring navigators. (9) Hans Christian Andersen was a native of Denmark. What stories do you know that were written by him? (10) Read and retell stories of the Norse gods in oldtime mythology.

VII. RUSSIA

Map Questions (Fig. 415). — (1) About how much of Europe is included in Russia? (2) What part of the distance from pole to equator is included? (3) What does this suggest concerning temperature and rainfall? (4) How much of the boundary of Russia is sea coast? (5) Name the seas which border it. (6) Name the mountains on or near the border. (7) What portion of Russia is occupied by plains? (Fig. 365.) (8) In what directions do the large rivers flow? Name the three longest. (9) What peculiar fact do you notice about the Caspian Sea? (10) Find Poland, Finland, and Lapland. (11) What parts of Asia are in the Russian Empire? (Fig. 469.)

Size and Position. — Russia in Europe is larger than all the other European countries together; and the Russian Empire, which includes Siberia and other lands in Asia, occupies about one-sixth of all the land upon the globe. The empire extends from the Baltic on the west to the Pacific on the east, and within its borders is included a great variety of climate. What countries in North and South America approach it in area? In variety of climate?

In spite of its vast extent, the development of Russia is greatly hindered by the lack of good harbors. In this respect it contrasts strongly with the United States. To be sure, the sea forms a large portion of the Russian boundary; but Archangel, the principal port on the White Sea, is icebound for nine months, and the Baltic ports for four or five months each year. Besides this, the entrances to the Baltic (p. 408) and Black seas are guarded by foreign nations. Why are the Caspian ports of little use?

Physiography. — Most of the large rivers in western Europe have their sources in the mountains. Give examples (Fig. 365). It is not so, however, in Russia where the central divide is a low, hilly region less than twelve hundred feet above sea level at its highest point. Aside from the mountains along the border this is the highest part of Russia. How does it compare in altitude with the highest point in flat Holland? (p. 370).

From what has been said, it is evident that most of Russia is a remarkably level plain (Fig. 365). Since several of the rivers are very long, what must be true as to the velocity of their currents? What must follow as to their value for navigation? What about the ease of canal construction?

In southeastern Russia, on the other hand, are the lofty Caucasus Mountains (Fig. 368), in which one of the peaks, the extinct volcano, Mt. Elbruz, is the highest mountain in Europe. But, at the very base of these mountains bordering the Caspian Sea are broad plains which in places are even lower than the level of the sea.

FIG. 423.

A Laplander's hut. The home of the Laplander is in northern Scandinavia and northwestern Russia.

The Caspian Sea, into which the longest river of Europe pours its floods, is the largest inland sea in the world. In spite of the enormous volume of water which enters these inland seas, the evaporation in that dry climate has caused them so to shrink in size that neither the Caspian nor the Aral Sea (Fig. 469) is now connected with the ocean. The surface of the Caspian is eighty-five feet below sea level, and by evaporation it is steadily growing smaller and salter, leaving broad, salt-covered plains round about it.

Climate. — The influence of distance from the ocean upon temperature and rainfall is well illustrated in Russia. Moscow is in the same latitude as Edinburgh; but while at Edinburgh the average temperature for January is 37°, at Moscow it is nearly 25° colder. Notice (Fig. 319) which summer isotherms pass nearest to these two cities. It was the severity of the Russian winter that caused Napoleon Bonaparte to lose nearly the whole of a great army when he was invading that country in 1812. What effect must this cold have upon navigation of the rivers?

Extreme drought, as well as extremes of temperature, are found in parts of eastern Russia. Although the rain-bearing winds meet with no barrier in sweeping over such level land, they nevertheless deposit so much moisture on the countries of western Europe that no part of Russia has heavy rainfall ; and the eastern part averages less than twenty inches per year (Fig. 364). Since this amount is barely sufficient for agriculture, the crops suffer, and famines follow in especially dry seasons. Southeastern Russia is altogether too arid for farming, being not only far from the ocean, but so far south that it is not greatly influenced by the prevailing westerlies.

People and Government.— The plains of Russia have offered no better barrier to the inroads of invaders than to the winds. We therefore find many kinds of people united under Russian rule. Most of these belong to the white race, but to a different division from the German and British peoples. The Russians are *Slavs*, while the inhabitants of Germany, Scandinavia, and the British Isles are of the *Teutonic* division. But Russia also contains many Jews, Teutons, and other people, including the Lapps (Figs. 423 and 424) who are classed with the Mongolian race. All together not less than forty languages are spoken within the realm.

Fig. 424.
A Lapp boy from Lapland in Russia.

In former centuries, while other parts of Europe were advancing in civilization, Russia was being raided by outsiders and its progress retarded by conquest. The country was so remote from western Europe that it felt little influence from the growing civilization of the west. Moreover, approach by water was then difficult, because formerly the only Russian sea-coast was on the Arctic. It was not until the time of Peter the Great (1682–1725) that Russia began to learn the lessons of civilization from other European nations.

These facts help to explain why Russia is so slightly advanced in some directions. While the common people of other European nations were demanding greater liberty, and were constantly acquiring education, the mass of the Russians were kept in subjection and ignorance. They were mere *serfs*, who were little better than slaves to their lords, the nobles. Although the serfs were liberated in the middle of the last century, almost no attempt has been made to educate the masses, and at present they possess little liberty.

The emperor, or *Czar*, is an absolute monarch "whose will alone is law." On purely local matters, however, the peasants have a voice. Those of a locality meet in a *Mir*, or assembly, to discuss matters of common interest and to elect officers from their number, somewhat as is done in town-meetings in the United States. Naturally, in this day of popular government, many of the people are dissatisfied, and it is on account of this discontent that attempts are made to assassinate the Czar. The attack is against the *form* of government, rather than against the Czar, who personally is usually an estimable man.

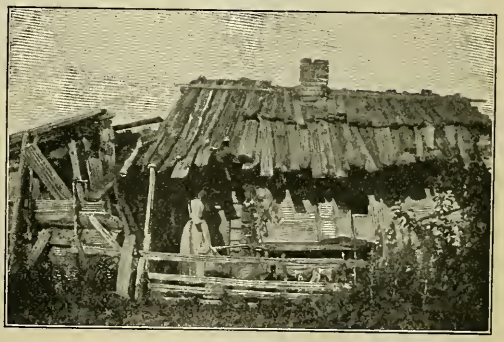


FIG. 425.

A fisherman's house in Finland. Fishing is a very important industry in Russian waters; and there is a great demand for fish owing to the number of fast days kept by the Greek Church, to which the majority of Russians belong.

Lumbering. — Nearly a third of European Russia is forest-covered, and the timber resources, as in Norway (p. 405), are among the greatest of the country. This forest supplies not only lumber, but pulp for paper and bark for tanning. Many fur-bearing animals live in the forest, as was formerly the case in other parts of Europe.

Farming and Grazing. — Both in the forest region and on the open plains to the south, there is extensive agriculture. Fully nine-tenths of the people are supported by farming, which makes Russia primarily an agricultural country.

The most important crops are the grains, especially rye, wheat, barley, and oats. Russia ranks next to the United States among grain-producing countries, and wheat is one of its principal exports. Another important crop is hay; and potatoes, sugar beets, and flax are extensively raised in the cool temperate climate. In southern Russia the warm climate permits the culture of grapes, tobacco, and corn; and south of the Caucasus even olives and cotton are produced.

On the grazing lands of the arid steppes, which resemble our western plains, many sheep, cattle, and horses are raised. The nomadic herdsmen, such as the *Cossacks*, still retain many of the customs of the shepherds and herders of Bible times, who dwelt farther south in Asia.

Mineral Wealth. — Some parts of Russia contain mineral deposits of great value. In the Ural Mountains, for example, are gold, silver, copper, platinum, and other metals, besides some precious stones and graphite, or "black lead," which is used in lead pencils.

Coal and iron are mined in several parts of Russia (Fig. 366), and each year the amount is increasing. As in Great Britain, some of the iron ore is so near coal and limestone that it is easily smelted.

Russia ranks next to the United States in the production of petroleum. This oil is found in several places, especially at BAKU on the Caspian. But since its quality is not as good as that of the United States, it is less useful for kerosene. Large quantities are therefore consumed as fuel for steamers on the Caspian and Volga; and, as in southern California, the oil is also used in locomotives.

Manufacturing. — Although numerous factories have recently been established in Russia, about six-sevenths of the manufacturing population carry on the work by hand in their own homes. What a contrast to the United States and to Great Britain!

Distilling and brewing are the principal forms of manufacturing not done in the homes; then come cotton manufacturing and sugar refining, while flour mills, woollen and linen factories, and iron works follow. What raw products of Russia encourage these industries?

Principal Cities and their Commerce

Moscow and Nijni Novgorod. — The former isolation of Russia from other countries is illustrated by the fact that the principal cities were for a long time situated far in the interior. For example, Moscow, the second city in size and one of the chief manufacturing centres, and once the capital of the empire, is located almost in the centre of the realm, as Madrid is in Spain. The point was well chosen, because rivers, which canals could easily connect, diverge from this section in all directions. By the introduction of railways the advantage of this location was so increased that Moscow is now the great railway centre of Russia, as Madrid is of Spain, and for the same reason. State this reason (p. 396). But the land about the city, unlike that around Madrid, is fertile and densely populated.

Fig. 426.
Greek Church at Moscow.

Not only is Moscow adorned with royal palaces and government buildings, but it is the holy city of Russia, and therefore has numerous convents and churches (Fig. 426). The University of Moscow, the largest in the empire, is attended by about four thousand students.

East of Moscow, on the Volga River, is Nijni Novgorod, renowned for its annual fairs. A great trade centre is needed somewhere in this region for the exchange of Asiatic and of Russian products, and this city is suitable for the purpose because of its superior water connections. Point them out (Map, Fig. 415). The fairs, held in August and September, are the greatest in Europe, and attract as many as two hundred

thousand strangers annually. In a single season goods are exchanged to the value of nearly $200,000,000, and prices are fixed on crops and other materials for the coming year. Why could not such a centre for trade be better located upon the Caspian Sea?

St. Petersburg. — While the two cities just described are very old, their position in the interior is not well adapted for communication with distant nations. It was this fact which led Peter the Great, in 1703, to found St. Petersburg at the head of the Gulf of Finland. The site selected is very marshy, and the climate is cold, foggy, and unhealthful. Moreover, the arm of the sea on which the city is situated is so shallow that a ship canal twenty miles in length has been necessary to connect it with the deeper water farther west. In addition, the harbor is ice-bound for more than four months each year.

FIG. 427.
St. Isaac's Church in St. Petersburg.

Yet in spite of all these disadvantages, St. Petersburg is already the largest city in Russia, and the fifth in size in Europe — facts that show how much such a seaport was needed. It is also one of the most magnificent of cities, having especially wide streets, splendid public buildings, and fine residences. More goods are shipped by this route than from any other Baltic port. RIGA, to the southwest, has about half as much shipping.

Odessa. — Odessa, another important port, was founded a little over a century ago when Russia obtained possession of the northwestern coast of the Black Sea. Since the harbor is rarely frozen over for more than a few days, it possesses a great advantage over St. Petersburg, which it equals in its shipping trade. Besides

being the chief outlet for the vast grain trade of southern Russia, and the principal port on the Black Sea, Odessa is an important flour-milling centre, like Minneapolis.

Warsaw and Lodz. — Thus far the Russians have found no opportunity to obtain possession of Constantinople, although they have, no doubt, felt many a yearning in that direction. Why? But their progress in the west has not been confined to the establishment of seaports. They have extended their territory in various directions, one of their most important acquisitions being a large part of *Poland*, in which are situated two of the leading cities of Russia, — WARSAW and LODZ. The former is a centre for the railways that connect Russia with western Europe, and the latter is an important manufacturing centre. Much coal and iron are mined in this vicinity.

Finland, whose capital is HELSINGFORS (Fig. 428), although a part of the Russian Empire, has a measure of independence. There is a parliament which makes laws, but the Czar has the right of veto. Unlike the Russians, most of whom belong to the Greek Church, the Finns are mostly Protestants, belonging to the Lutheran Church. Mistreatment by the Russian government has recently led to the migration of many Finns and Poles to the United States. The policy of the Russian is to destroy the nationality of the people.

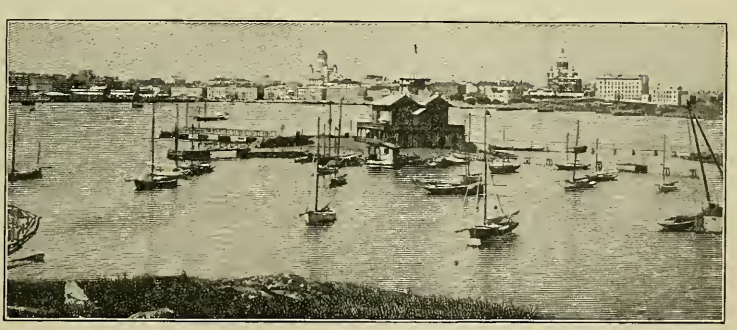


FIG. 428.

A view of Helsingfors in Finland.

Remembering that Russia owns Siberia also, and has lately been establishing ports on the Pacific coast and building railways to them, it is evident that this is one of the most progressive of European

nations. Russia is now one of the six Great Powers, and, with the education of the people and the development of the immense resources, the nation promises to grow rapidly more powerful.

REVIEW QUESTIONS. — (1) Tell about the size of the Russian Empire. (2) What can you say about its position with reference to the sea? (3) Describe its surface features. (4) Tell about the rivers. (5) Tell about the Caspian Sea. (6) How does the climate vary? (7) Tell about the people. (8) What about the government? (9) Tell about lumbering. (10) What are the principal farm products? (11) What about grazing? (12) What mineral products are found? Where? (13) For what purpose is some of the petroleum used? (14) What is the condition of manufacturing? (15) Tell about each of the cities: (*a*) Moscow — location, comparison with Madrid, importance; (*b*) Nijni Novgorod — location, fairs; (*c*) St. Petersburg — location, surroundings, importance; (*d*) Odessa — location, importance; (*e*) Warsaw; (*f*) Lodz. (16) What are the conditions in Finland? (17) What about Russia's future?

SUGGESTIONS. — (1) Compare the area of the Caspian Sea with that of Lake Superior. (2) Read about how the inhabitants of Moscow burned their houses in 1812 rather than give shelter to Napoleon's army. What followed? (3) What must be some of the difficulties connected with building good roads in southern Russia? (4) What did Kosciusko, the Pole, do to make his name memorable to Americans? (5) Have you read the story of Thaddeus of Warsaw? If so, what can you tell about it? (6) Read about how Peter the Great wandered through European countries as a common workman, in order to obtain the benefit of Western ideas. (7) Make a sketch map of Russia, with principal rivers, cities, etc. (8) Compare the area and population of Russia and the United States. Also the degrees of latitude included in the two countries. (9) Where else besides on the Atlantic, Pacific, and Mediterranean does Russia desire an opening to the sea?

For REFERENCES, see Teacher's Book.

VIII. GERMAN EMPIRE

Map Questions (Fig. 439). — Compare the latitude of Berlin with that of London. (2) Of New York. (3) Estimate the greatest length of Germany from east to west. From north to south. (4) How does it compare in size with the British Isles? Russia? (5) How much of the boundary is natural? (See also Fig. 415.) (6) Point out the principal rivers. To what extent do they correspond in general direction? (7) Is most of the surface plain or mountainous? (Fig. 365.) Where are the mountains? (8) What facts do you notice about the coast line? (9) Is the North Sea or the Baltic the more favorable place for seaports? Why?

Extent and Position. — The German Empire contains 209,000 square miles, which is an area a little larger than France and twice the size of Colorado. But it has about 56,000,000 inhabitants, or over a hundred times as many as Colorado and 17,000,000 more than France.

The position of this great nation offers a marked contrast to that of Great Britain. Only about one-third of its boundary is water, while its frontier comes in contact with seven independent countries, aside from Luxemburg. What are their names?

The location of the British Isles is regarded as favorable for world commerce, inasmuch as densely populated Europe lies near at hand on one side, while the far-away New World is on the other side. The situation of Germany possesses great advantages, also. Owing to her central location, most of the markets of the continent are at her very doors, while two of her principal ports, Hamburg and Bremen, face Great Britain and the West. On the map (Fig. 415) find some of the large cities that can be quickly reached from Germany. In these days of railways Germany's central position is superior to that of England for European trade.

People and Government. — It has required a great struggle, which has lasted through centuries, to bring under one rule the various people within the boundary line of the German Empire. For cen-

turies there was, at best, only a loose confederation to hold them together ; and the numerous states which occupied the region were often at war with one another and with surrounding nations. Their condition was, in some respects, similar to our own during and immediately following the Revolutionary War. There was, however, one important fact to their disadvantage — their meddlesome neighbors helped to intensify the quarrels that arose among them.

During the War of 1866 Prussia and Austria, the principal kingdoms of the *German Confederation*, strove with each other for the exclusive leadership. Prussia proved successful, and Austria withdrew from the union. In 1871 the new *German Empire*, with its present boundaries, was established.

All together there are twenty-six states within the Empire, some of them being *kingdoms*, some *duchies*, and some merely *free towns*. The smallest of all is the city of Bremen, occupying only ninety-nine square miles, while Prussia, the largest, contains more than one-half of the entire empire, and in 1897 had a population of about 32,000,000. They are all united under a central authority, more closely and less independently than our states. In place of a President they have an Emperor (the King of Prussia being by law *Emperor* of Germany), and their form of government is a constitutional monarchy (Fig. 429). However, the power of the Emperor is much greater than that of the British king, though less absolute than that of the Russian Czar.

Defence. — The Germans in a war with France in 1870 not only defeated the French, but compelled them to pay a large sum of money. At the same time they seized the French territory west of the Rhine, called Alsace-Lorraine, in which Metz and Strassburg are situated. This is a suggestion of the way in which much of Germany's irregular frontier line has been determined. To a great extent mountains form the southern boundary, and water the northern ; but the eastern and western limits, largely decided by war, do not follow any natural barrier. Draw an outline map of Germany.

In order to preserve her present boundaries, Germany must be prepared to defend them at any time. This need calls many citizens to an occupation which we have not thus far considered, namely, that of *preparing for war*.

It is a fact that each of the great European nations is jealously watching the others; and as no one of them knows how soon a dispute may arise with its neighbor, each maintains a large and thoroughly equipped army. The object of each is to be so dangerous that others may fear to offend or attack it; and if once involved in war to come off victorious.

For such reasons all able-bodied young men in Germany are required to devote usually two full years and parts of several succeeding years to active military training. Most of them enter the service at about the age of twenty; and as there are about four hundred thousand males arriving at that age every year, one can obtain some idea of what it costs a Euro-

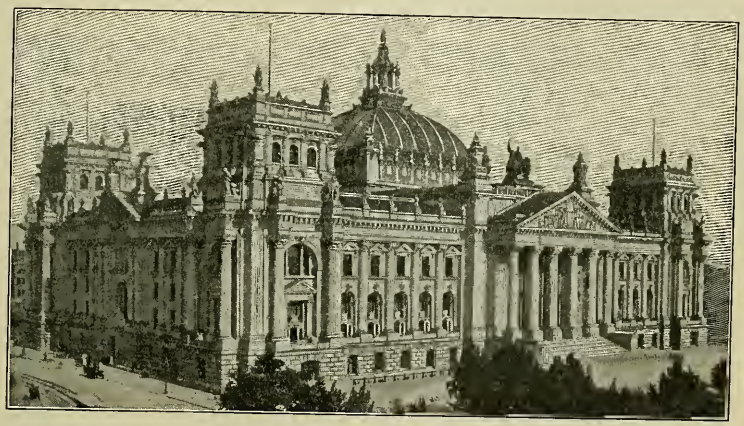


FIG. 429.

The German *Reichstag*, corresponding to our House of Representatives, meets in this building, in Berlin. The other legislative branch, called the *Bundesrath*, is composed of members appointed by the various German states.

pean nation to have close neighbors. The peace footing of the German army is almost six hundred thousand men, which is larger than the number employed in all the mines of the British Isles. In addition to this, the German navy calls for many recruits. As all these men are, for the time being, withdrawn from industrial pursuits, the nation loses the fruits of their labor for that period. Thus the productiveness of the nation is reduced.

Extensive fortifications are built near the boundary, as at Cologne, Metz, and Strassburg on the French side, and Königsberg and Posen near Russia. They are also numerous in the neighborhood of the great interior cities, and at strategic points here and there. The expense of these forti-

fications, and the vast sums required to keep up the army and navy, form a heavy drain upon the nation.

Germany is not unlike the other European nations in these respects, As already stated (p. 366), the British, having no immediate neighbors. rely mainly upon their powerful navy for defence. But every one of the Great Powers is calling for many men, and expending large sums of money either for the army or navy, or both. In fact, preparation for war is one of the great occupations of Europe to-day.

Physiography. — Germany consists of two quite different parts. The southern section is mainly a mountainous region of ancient

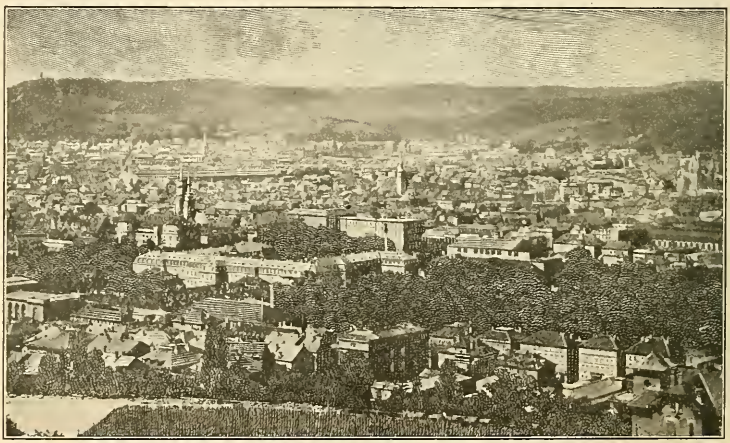


Fig. 430.

The city of Stuttgart in the low plateau of ancient mountain land of southern Germany.

date, and therefore worn low (Fig. 430), like the mountains of Great Britain and New England. It is, in fact, a plateau from one to two thousand feet in height, with some ranges, like the Erzgebirge, rising high enough to be commonly classed as mountains. Only in the extreme south, on the edge of the Alps, is a great altitude reached, one peak being nearly ten thousand feet above sea level.

Valuable minerals have been revealed by the wearing away of these ancient mountains ; indeed, the mineral belt of southern Bel-

gium and northeastern France is but a continuation of the highlands which cross southern and central Germany.

Northern Germany is a lowland, broadening toward the east until it merges into the plains of Russia. In the neighborhood of Holland the plain is very low and flat (Fig. 431): but in most places, owing to the irregular deposits left by the Scandinavian glaciers, it is rolling. Elevations in this part of Germany rarely exceed six hundred feet. This plain is, in large part, included in Prussia, the greatest and most powerful of the German kingdoms.

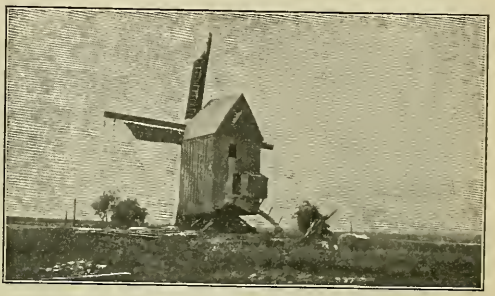


FIG. 431.

A view on the very level plain of north Germany.

Most of the drainage is northward into the North and Baltic seas. What river rises in the highland region of southern Germany, and crosses Austria, finally to enter the Black Sea? Name and trace the courses of four large rivers which flow northward. Of these the Rhine is the most important. Notice the large number of cities along its banks. While parts of the Rhine valley are broad and densely settled, the river in the central part of its course flows through a deep and beautiful gorge cut in the highlands.

Climate. — The average yearly rainfall is about twenty-eight inches, decreasing toward the east about twenty inches near the Russian border. That these figures may be better appreciated, we may recall the fact that the average rainfall in most parts of the United States east of the Mississippi River is over forty inches.

Note the number of degrees of latitude included in Germany. Nevertheless, owing to the difference in elevation, the southern plateau is about as cold in winter as the northern lowland. In summer, however, the southern part is warmer than the northern. But the valleys of the south, being low and enclosed, are warmer than the northern plains both in winter and in summer, and are therefore capable of producing such crops as tobacco and grapes.

The increase in extremes of temperature toward the east, or away from the ocean, is illustrated on the coast. The North Sea is almost free from ice, while the Baltic ports are frozen over for a time; and the farther east they lie, the longer their trade is arrested by the cold. What must be some of the results of this fact?

Forests. — That the mountains of Germany are low enough to be well wooded, is indicated by the frequent use of the word *wald* (the

Fig. 432.

A view on the Rhine at Bingen. Notice the opposite bank where the earth has been terraced so that even the hill slope may be used for vineyards.

German for wood) in the mountain names. Where the soil is poor, as in the stretches of sand deposited during the Ice Age, much of the lowland is also wooded. All together about one-fourth of the surface of the empire is covered with trees.

The tendency of the German people to useful and sensible economy is well illustrated in their treatment of the woodlands. Instead of wantonly devastating them by fire and the axe — as has been done in so many parts of our own country — they maintain an excellent system of forest culture. Trees are planted in place of those that are cut for timber, these are given proper care, and thus the woods continue to be abundant. By this system, also, forest culture becomes profitable. It is partly due to the encouragement received from the success in Germany, that forest reservations have been established in various parts of the United States, and schools of

forestry founded, as in New York, for the purpose of studying how to care properly for our woods.

Agriculture and Grazing. — On the whole, Germany has not a fertile soil; but the farm products are very extensive, because the people are both industrious and intelligent, and their method of cultivating the soil is excellent. What countries may well be contrasted with them in this respect?

More than one-third of the population are dependent for their living upon agriculture, the leading industry of the nation. Germany is one of the most important grain-producing countries of Europe; but here rye replaces wheat as the principal grain. Potatoes, introduced from America, are raised in such quantities that, like rye, they form one of the principal foods. These two crops are extensively cultivated, both because they are a cheap food, and because they flourish in the light soil and cool summer climate, characteristic of so much of Germany. Sugar beets, hay, oats, and barley are other important crops of the northern plains, while in the Rhine and other warm, sheltered valleys of the south, hops, tobacco, and grapes are raised in large quantities.

Since much of the lowland is too sandy for cultivation, and much of the highland too rugged, it is not surprising that one-sixth of all the surface consists of natural pasture. Cattle for beef and for dairy purposes are kept in nearly all parts of the empire, but especially in the damper climate of the west. Contrary to the condition in most countries, sheep are less numerous than cattle. The number of sheep is decreasing because wool may be so cheaply imported; but swine have greatly increased, largely because of the cheap food supplied by refuse from the beet sugar factories, which have been increasing in number (p. 425).

Mining. — Next to Great Britain, Germany is the greatest mining country of Europe; and, as in the United Kingdom, her most valuable minerals, coal and iron, often occur in the same region. Germany and Belgium together produce more zinc than all the rest of the world; and nearly half the silver obtained in Europe is mined in Germany. Much lead and copper also come from Germany.

This country resembles our own in the wide distribution of its coal beds. The coal fields that were found in Belgium and northeastern France

(p. 375) extend into Germany in the neighborhood of Aachen; and from this point eastward to the Russian border there are several important coal fields.

There are also immense salt mines, as at Stassfurt, northwest of Halle, from which are obtained not only table salt, but products used in the manufacture of soap, in dyeing, bleaching, glass making, and calico printing. The Germans employ thoroughly scientific methods in their mining work; and it is from them that other nations have learned many of the methods which are employed in reducing ores to metal.

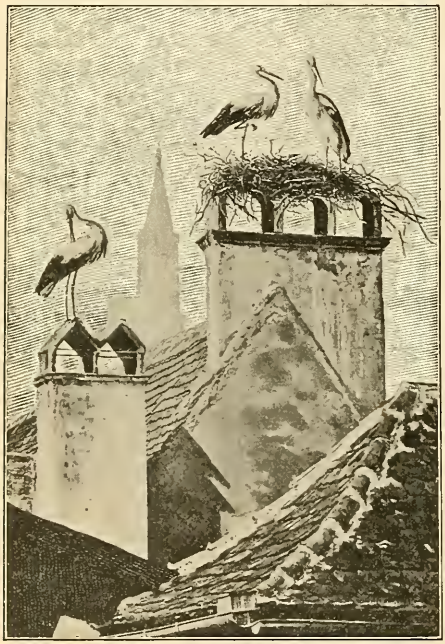


Fig. 433.

Storks at Strassburg, — a familiar bird in Germany which builds nests on the chimneys.

Manufacturing. — From the above facts we may expect to find Germany a great manufacturing country, with her manufacturing centres well distributed. Explain why.

About a third of the inhabitants are dependent upon manufacturing, and in recent years Germany has so advanced in this industry that she now ranks next to the United Kingdom in the quantity and excellence of her goods.

The distribution of the coal and iron gives the key to the principal centres for iron manufacturing. The busiest section is along the Rhine, in the vicinity of Cologne, which may well be compared with northern England in the extent of its industries (p. 355). A second centre is about Dresden and Chemnitz, and a third at Breslau in the southeastern corner of the empire. As in other countries so far studied, the textile industries are best developed near the coal fields. Therefore the sections mentioned above are distinguished for cotton, woollen, and silk factories as well as for iron.

The extensive forests partly account for a third occupation of many sections; namely, the manufacture of furniture, paper, and other materials made of wood.

An excellent illustration of the fact that the Germans use scientific methods in their manufacturing, as in other industries, is found in their manufacture of dyestuffs. They have discovered how to make dyes from mineral products so cheaply that the expensive vegetable dyes formerly in use have been practically abandoned. This is of importance in the manufacture of various kinds of colored textiles.

The map (Fig. 439) shows no cities south of BRESLAU; yet a busy manufacturing centre exists there. The explanation is that the people carry on this work largely in their own homes, instead of in factories. Living in a hilly country, where agriculture is not very profitable, they spin and weave the flax and wool raised nearby. They also make lace and carve wood; but, although villages stretch for miles along the valleys, there are no large towns.

The manufacture of spirituous liquors is another prominent German industry. A portion of the immense potato crop is made into spirits, and also some of the beets. But beer, in which barley and hops are used, is the common beverage. From the grapes of southern Germany much wine is manufactured, though not nearly so much as in France.

For a long time nearly all sugar was obtained from sugar-cane although maple trees supplied a small amount ; but German chemists found a means of extracting sugar from beets. By improving the process, and by developing the beets until they contained more sugar, the great industries of sugar beet raising, and the refining of beet root sugar, have been made possible. Each year this source of sugar has been proving a more formidable rival to sugar-cane, until now a large part of the sugar consumed in Europe, and even some of that used in North America, is obtained from sugar beets. One important reason why this industry has thrived is that sugar beets grow in a cool temperate climate where population is dense and markets are numerous.

Formerly Germany had to rely upon foreigners for sugar ; but since the development of this industry, beet sugar has become one of its greatest exports. Nevertheless, the population is so dense and so many are engaged in manufacturing, that, like the British,

the Germans cannot raise all the food they need. Therefore much food, such as wheat and meat, as well as raw materials for manufacture, such as cotton, wool, and silk, must come from abroad.

Germany's Rapid Advance. — No European country in the last quarter of a century has experienced such rapid growth as Germany. For example, in the twenty-five years preceding 1895 her increase in population was over 11,000,000, while France had an increase of only 2,500,000. The empire has had a corresponding gain in wealth.

Undoubtedly the strong central government established in 1871, and with it the laying aside of the petty jealousies that paralyzed industries, is one cause of this advance. But there are many other causes, of which one of the most influential is education and the encouragement of science. Every German child is forced by law to attend school; and careful attention is given to the study of the various industries, foreign products, languages, etc. In the higher commercial and technical schools, young men obtain excellent preparation for various kinds of business, while in many other countries there is little or no provision for such education.

The value of scientific work is fully recognized and encouraged by the government; and that such encouragement is profitable to the nation is proved by the wonderful development of the sugar industry, the mines, and the factories. Not many years ago much of the manufacturing was done by hand; but now the best machinery has been introduced, and Germany is one of the three leading manufacturing nations of the world. Name the other two.

Colonies and Emigrants. — The recent acquisition of foreign territory is an indication of the growth of Germany. The empire is now in possession of extensive areas in the island of New Guinea, north of Australia, and in both east and west Africa, as well as smaller colonies elsewhere (Fig. 416).

Many Germans have emigrated to various parts of the New World. Fully five million emigrants have come to the United States within the last seventy-five years, while the British Isles have sent us not quite seven million. Naturally many of the German emigrants to other countries have kept up trade with their *fatherland*, and have thereby increased the commerce of Germany.

Principal Cities and their Commerce

After the preceding statements, it may not be surprising to learn that the leading German cities have experienced as rapid a growth as those of America. In the twenty years between 1870 and 1890, for example, Berlin had a more rapid growth than New York, and added as many actual new residents as Chicago. In 1875 Boston had almost a hundred thousand more inhabitants than Hamburg; but now Hamburg has nearly a hundred thousand more than Boston.

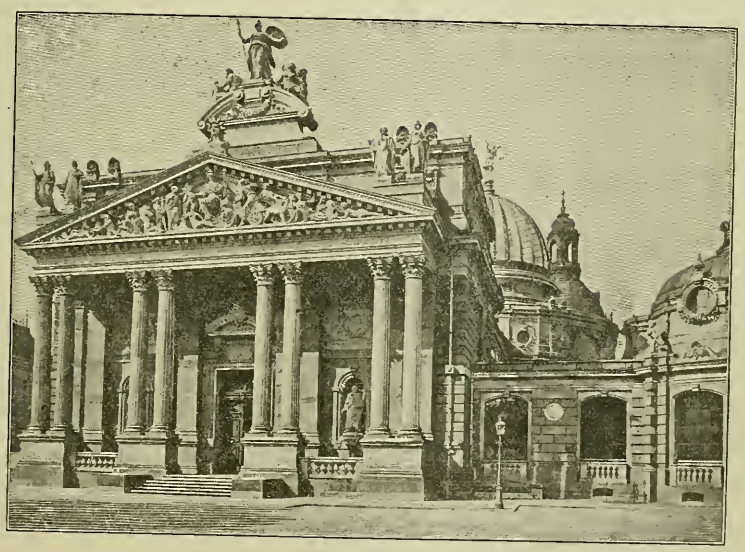


Fig. 434.

The Dresden Art Museum.

Other German cities have increased, and are still increasing, in population at much the same rate.

Berlin. — The position of Berlin, on a small river (Fig. 438) on the North German plain, midway between the coast and the highlands, may not at first seem advantageous. But the Oder and some of the tributaries of the Elbe approach so near each other in this section that they have easily been united by canal. Thus Berlin has water connection with both Hamburg and Stettin, as well as with

all parts of these two river systems, — a very important aid in obtaining fuel, food, etc., for the city. Observe also (Fig. 439) that Berlin lies on the direct route from Hamburg to Breslau, and from Stettin to Leipzig, and that other large cities surround it. It is, moreover, on the route of several great European railways, and is therefore one of the important railway centres of the continent.

With such excellent connections, by water and by rail, Berlin has naturally become one of the great manufacturing cities. Fully half the residents are supported by this industry, which includes brewing, the manufacture of fancy articles, clothing, machinery, etc. Besides being the capital of Prussia and of the German Empire, Berlin is the centre of German banking. It is noted for its art and music, and for its great university, the largest in the empire. There are a number of suburbs, one being POTSDAM (Fig. 438), the German "Versailles," in which are located several royal palaces.

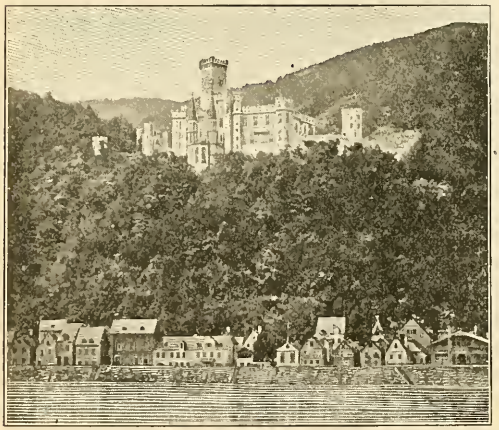


FIG. 435.
A castle on the Rhine.

Interior Cities near Berlin. — Among the cities not far from Berlin is LEIPZIG, the fourth largest in the empire. It is situated at the junction of two small streams at a point where roads from the highland meet those from the lowland. Formerly it was a centre for wagon roads, and now it has naturally become a railway centre. Owing to its favorable position, Leipzig is, next to Berlin, the most important trade centre of Germany. One of its leading articles of commerce is fur. It is the seat of a noted university, and a centre for the German book trade.

DRESDEN, southeast of Leipzig, is noted for its art museum (Fig. 434), which rivals the Louvre of Paris. The beautiful Dresden

china is made in this vicinity, and in recent years much manufacturing has developed, for Dresden is situated on a navigable river and has coal near at hand. It is, moreover, the capital of Saxony, the most densely settled German state.

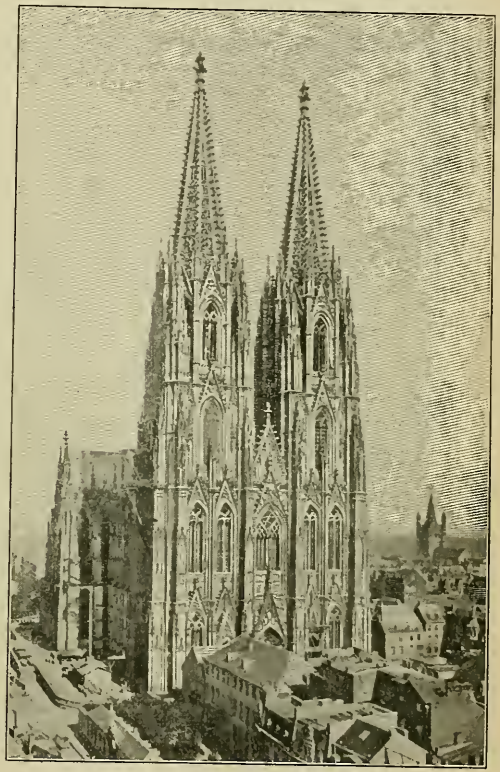


Fig. 436.
The Cologne Cathedral, one of the most beautiful Gothic edifices in the world, was begun in 1248 and completed in 1880.

Chemnitz, near by, has important textile industries; and Halle and Magdeburg, farther to the northwest, and in the centre of the chief beet-growing area, are extensively engaged in the manufacture of sugar.

Breslau, only a little smaller than Leipzig, is on a navigable river, and has the advantage of being near a very rich coal and iron field. It is, therefore, a great manufacturing city, and its situation near the frontier makes it an important market for eastern and central Europe.

Seaports. — Hamburg, which is larger than St. Louis, is the second city in Germany, and the most important seaport on the continent. The reasons for this are clear when it is known that the estuary of the Elbe (Fig. 438) makes an excellent harbor, usually free from ice, and that Germany has an extensive foreign trade. Name some articles which that port probably receives from the United States. What water connections has Hamburg with the interior?

Bremen and Stettin also admit large vessels, and are the chief rivals of Hamburg; but they together have less than one-half as much commerce as Hamburg. In what respects are they less favorably situated for commerce than Hamburg?

Name other Baltic ports beside Stettin. Which is a natural outlet for wheat from Russian Poland? Estimate the distance saved to the Baltic ports by the construction of the Kaiser Wilhelm canal, which is sixty-one miles in length.

Cities along the Rhine. — On ascending the river into Germany we come to the great manufacturing region already mentioned

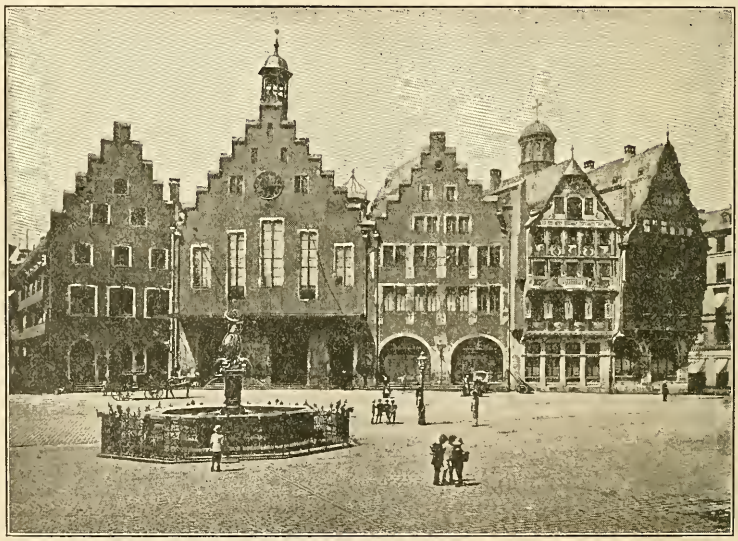


Fig. 437.
A scene in Frankfort.

(p. 424). What cities are there? Cologne, the largest, with a population of more than a third of a million, is on the river bank. It is a great shipping point, since railways cross the river, and boats from London and other places are able to ascend to this point.

Elberfeld and Barmen have textile manufactories; Essen is famous for the Krupp steel works; Krefeld is an important silk manufacturing town; Aachen (Aix-la-Chapelle in French) manufactures woollen cloth.

FIG. 438.

Berlin and vicinity.

CENTRAL EUROPE.
Scale of Miles.
0 100 200
Cities with over 1,000,000 : . . Berlin
Cities with 200,000 to 1,000,000 : . . . Rome
Cities with 100,000 to 200,000 : . . . . Venice
Smaller Places : . . . . . Larissa
Capitals with less than 100,000 : . Belgrade
Capitals of Countries: ⊙ Other Places: •
15 Longitude East 20 from Greenwich 25
NORTH SEA
NORWAY
Skager Rock
Cattegat
SWEDEN
Gothenburg
Jonkoping
Linkoping
GOTLAND
Gulf of Riga
Riga
RUSSIA
Aarhus
DENMARK
Copenhagen
Odense
SEELAND
Lund
Malmo
Karlskrona
ÖLAND
BORNHOLM (To Den.)
Baltic Sea
Königsberg
Danzig
KAISER WILHELM CANAL
Kiel
Lubeck
Hamburg
Altona
Bremen
Elbe R.
Stettin
Oder R.
Hanover
Charlottenburg
Brunswick
Berlin
Posen
Vistula R.
Warsaw
Lodz
POLAND
GERMAN EMPIRE
Dortmund
Magdeburg
Krefeld
Essen
Kassel
Halle
Leipzig
Gorlitz
Dusseldorf
Barmen
Elberfeld
Aachen
Cologne
Erfurt
Dresden
Chemnitz
Breslau
Rhine R.
Frankfort on-Main
Erzgebirge
Reichenberg
Carlsbad
Prague
Mainz
LUXEMBURG
Darmstadt
Wurzburg
Luxemburg
Mannheim
Nuremberg
Pilsen
Krakow
Lemberg
Metz
Karlsruhe
Stuttgart
Baden-Baden
Budweis
Brunn
Carpathian Mts.
Strassburg
Augsburg
Munich
Linz
Vienna
Pressburg
Kaschau
Czernowitz
Dniester R.
Pruth R.
Mulhausen
Basel
Zurich
St. Gallen
Lucerne
Berne
Innsbruck
Salzburg
Odenburg
Danube
Budapest
Debreczen
Jassy
Odessa
WITZERLAND
AUSTRIA HUNGARY
Gratz
Balaton L.
Maria Theresiopel
Szegedin
Klausenburg
Geneva
Laibach
Agram
Temesvar
Kronstadt
Galatz
Mt. Blanc
Milan
Trieste
Thiess R.
Braila
Turin
Verona
Padua
Venice
Fiume
Mt. Cenis
Po R.
Ferrara
Pola
Banjaluka
Save R.
Belgrade
ROUMANIA
Bucharest
Krajova
Genoa
Ravenna
Bologna
Adriatic Sea
SERVIA
Rustchuk
Varna
Black Sea
Pisa
San Marino
Leghorn
Florence
Ancona
Nish
Danube R.
BULGARIA
Sofia
Balkan Mts.
Philippopolis
Bosporus
MONTE-NEGRO
Cettinje
Prisrend
Adrianople
CORSICA (To France)
Ajaccio
Appennines
Scutari
Uskup
Rome
Foggia
TURKEY
Constantinople
Sea of Marmora
Seres
Monastir
Salonica
Gallipoli
Sassari
Naples
Mt. Vesuvius
Bari
Brindisi
Tyrrhenian Sea
Gulf of Taranto
Otranto
Dardanelles
SARDINIA (To Italy)
Cagliari
Corfu
Janina
Larissa
Trikala
Ægean Sea
Str. of Messina
Ionian Sea
GREECE
Eubœa
Athens
Palermo
Messina
IONIAN ISLANDS
Patras
Gortho (Corinth)
Piræus
SAMOS
SICILY
Mt. Etna
Catania
Kalamata
MEDITERRANEAN SEA
AFRICA
C. Matapan
THE M-N. CO.

FIG. 439.

Just beyond the great bend in the Rhine is FRANKFORT, on a navigable tributary, the Main, along which lies the easiest route from the Rhine valley to the Danube. Since the railway from the German plain to the upper Rhine passes Frankfort, it is a centre of important trade routes, and therefore one of the leading trading and banking centres in western Germany. It has long been a prominent city and was the capital of the old German Confederation (p. 418).

Railways to the Danube pass through MUNICH, the capital of the kingdom of Bavaria. Although so far to the south, and so distant from coal, Munich is the third city in size in the realm. It is on the trade routes from Germany to Italy and to Austria, and is accordingly an important railway centre. Much of its renown is due to its art collections and its art industries, such as work in bronze, gold, silver, glass painting, and porcelain manufacturing.

North of Munich, on the road to Berlin, is NUREMBERG, a city widely known for its careful preservation of the old art and architecture that made it famous in former centuries, and for its present manufacture of toys.

REVIEW QUESTIONS. — Give (1) the area of Germany; (2) the population; (3) the boundaries. (4) What advantage does Germany's position give her for European trade? Tell about (5) the early condition; (6) the government; (7) preparation for war; (8) physiography; (9) rainfall; (10) temperature; (11) forests; (12) agriculture; (13) grazing; (14) mining; (15) manufacturing. (16) Give some of the causes for Germany's recent advance. (17) What about the growth of German cities? Tell (18) about Berlin; (19) cities near Berlin; (20) the seaports. (21) What about cities along the banks of the Rhine? (22) Give reasons for the importance of Munich.

SUGGESTIONS. — (1) Look in an atlas to find in what part of the empire the larger states, such as Prussia, Bavaria, Saxony, etc., are situated. (2) People often assert that the peace of Europe is preserved by extensive preparation for war; in what sense can this be true? (3) What must be some of the benefits of two years of active training in the army, aside from preparation for war? What some of the disadvantages? What relation has this to emigration? (4) What is the size of our standing army? Why so small? (5) What seaports of Europe most nearly approach Hamburg in size? (6) How may the Kaiser Wilhelm canal possibly prove an injury to Hamburg? (7) Show that Germany in her industries resembles Great Britain, while contrasting with Russia and Norway. (8) Find out something about Goethe, Schiller, Humboldt, Emperor William the First, Bismarck, Von Moltke, Wagner, and Schumann. (9) Read about Martin Luther and the German Reformation.

IX. SWITZERLAND

Physiography and Climate. — This is a very mountainous country (Figs. 440–444), for the Jura Mountains are on the northwestern border, while the Alps occupy the southern half. Between these two mountain systems, which extend northeast and southwest, is a low, hilly plateau, from one to two thousand feet in altitude. About one-third of Switzerland is included in the plateau belt. In so rugged a country one would not expect to find a large population; yet Switzerland is almost as densely settled as France, and much more so than the state of New York.

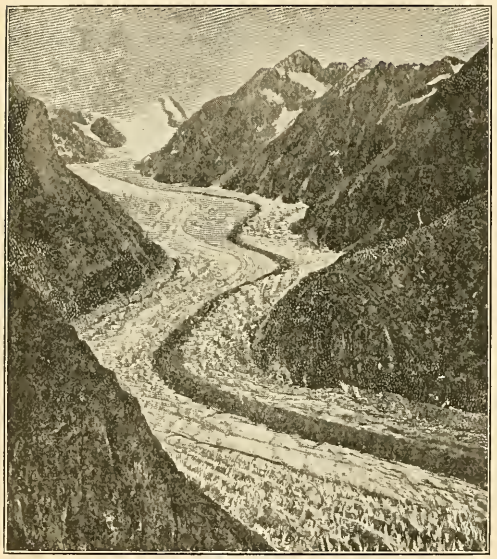


FIG. 440.
A glacier in the Swiss Alps.

It is evident that the temperature of this mountainous country must be low, and that it must vary greatly with the altitude. This is well illustrated in the Alps, at whose base are found chestnut and walnut trees, which are replaced higher up by beech, maple, and other trees of the cool temperate zones, and still higher by a belt of evergreens. Above these come dwarfed trees, shrubs, grass, etc.; and higher still, at an average elevation of about nine thousand feet above sea level, the snow line is reached.

The numerous lofty mountains, rising in the path of the prevailing westerlies, cause Switzerland to be one of the wettest countries on the continent. On the higher mountains much snow falls, and, sliding down the mountain sides in the form of avalanches, it gathers in the valleys to produce streams of ice, or *glaciers* (Fig. 440). These move slowly down the valleys until they reach a point below the snow line where the ice melts. They there deposit terminal moraines, which, though smaller, resemble the moraines made by the continental glaciers of the Ice Age (p. 10). The Rhone and many other rivers are supplied with water by the melting of the Alpine glaciers.

FIG. 441.
A Swiss peasant costume.

People and Government. — People who dwell among mountains develop a spirit of independence, as is illustrated by the story of William Tell. Thus we find that, as early as 1291, an agreement was made among a few of the small Swiss states, or *cantons*, for mutual protection against oppression. Many a time since then foreigners have attempted to conquer the Swiss; but, aided by the difficult approaches to their country, and by the mountain fastnesses to which they could retreat, they have been able to maintain their freedom, although the entire area of the country is only one-third that of Pennsylvania. Their twenty-two cantons, united somewhat as are our own states, now constitute a republic, whose neutrality is guaranteed by the Great Powers of Europe.

But while there is one stable government, there is not one common language. The country is most open toward the north, for the plateau of Switzerland merges into that of Germany. Naturally, therefore, German-speaking people are most abundant, making up 72 per cent of the population. The approach from France is much more difficult, and the French population constitutes only 22 per cent of the whole, while but 5 per cent speak Italian.

Farming. — Owing to the mountainous condition, only one acre in nine is fit for the plough. Yet agriculture is the principal industry. On the lower lands grain, grapes, and the silk-worm are raised, as in the neighboring countries; and on the lower mountains dairy-farming is important, as might be expected. The population is so dense, however, that much food must be imported, though some products, such as cheese and condensed milk, are exported.

Manufacturing. — Switzerland is very poor in mineral deposits, and coal is entirely lacking. This scarcity of raw materials would suggest that there is little manufacturing, but the inference is false.

FIG. 442.

A view of Lake Lucerne. The wall on the left bounds a road which is cut in the rock on the mountain side.

That the Swiss possess marked mechanical skill is indicated by the remarkable wood carving for which they have long been noted. Like New Englanders, in spite of the absence of coal, cotton, and ore deposits, they have engaged extensively in the manufacture of light articles, such as textile goods, jewelry, etc.

Some other facts, too, are favorable to the Swiss. Owing to the steep slopes, and to the plentiful supply of water from the snow-covered mountains, water power is so abundant that Switzerland is taking a leading place in the use of such power for the generation of electricity.

Also, while nature presents great obstacles to internal commerce, excellent materials for road building are everywhere present; and Switzerland, unlike Russia, takes pride in its especially fine roads (Fig. 442). Further than that, the commercial position of Switzerland is advantageous, since it

is entirely surrounded by densely populated countries which supply raw materials and furnish a market for manufactured goods. The influence of the latter fact upon the cities is very marked.

Leading Cities. — The largest city, ZURICH, on Lake Zurich, is an important railway centre. The St. Gothard railway, which runs northward from Genoa and Milan, connects the city with Italy, while other railways bring it in touch with France, Germany, and Austria. These roads are especially important for the introduction of foods and raw materials for manufacture. Therefore Zurich is the centre of one of the principal manufacturing districts, and is itself especially noted for the manufacture of silks, cotton, and machinery.

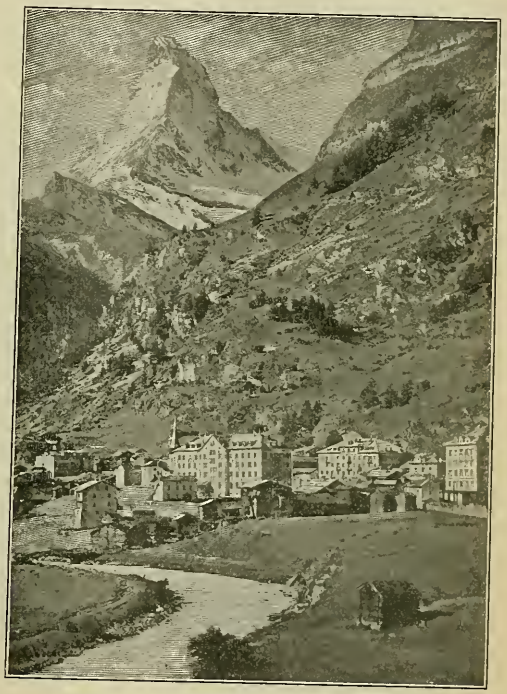


FIG. 443.
The Matterhorn peak, one of the steepest in Switzerland.

The *St. Gothard Tunnel*, from which the railway takes its name, is the longest tunnel in the world, and is a marvel of engineering skill. Before reaching the main tunnel several smaller ones are entered, through which the train winds in a spiral course, so that once or twice a passenger comes out of the mountain almost directly over the point where he entered it; and in some cases he can see, far below him, two places, one above the other, at which the train entered to follow its spiral course in the mountain rock. This method of construction is rendered necessary because the grade is so steep that a train could not be drawn directly up a straight track. The main tunnel, which is nine and one-fourth miles long, is quite straight. Since silk-making is the chief manufacturing industry in Switzerland, this

tunnel, by opening connection with the raw silk market of northern Italy, has greatly aided in its development. The value of such tunnels is further indicated by the fact that, notwithstanding the great expense, another, the *Simplon Tunnel*, is now being built a short distance west of the St. Gothard.

Basel, which, with its suburbs, forms the second centre of population in Switzerland, is the busiest railway point in the country. It is on the main line of the St. Gothard railway, and on the Rhine

Fig. 444.

Lake Geneva in a valley among the Alps. The Rhone River flows out of this lake.

where it enters Germany from Switzerland. Why is its position, near both France and Germany, favorable to manufacturing?

Geneva, situated on the southwestern end of Lake Geneva, where the Rhone enters France, is a noted educational centre. It is on a very ancient and important trade route from southern France to Germany (p. 389), and therefore has excellent railway connections. Water power is much used in generating electricity for use in manufacturing, and the city has long been distinguished for the manufacture of jewelry and scientific instruments.

BERNE, the capital, is centrally located; but it is a small city because its situation for commerce is not favorable.

Scenery and Tourists. — Many of the Swiss cities are beautifully situated upon lakes, and within sight of mountain peaks always covered by snow. LUCERNE, for example, is surrounded by most beautiful and varied scenery. The city is located upon Lake Lucerne, and lofty mountains rise in the immediate neighborhood (Fig. 442). Mts. Rigi and Pilatus are near by, and from their summit one obtains a magnificent view of the lake, bordered by green meadows and numerous villages over four thousand feet below, while in several directions, as far as the eye can reach, are the crests of stupendous, jagged mountains. On account of such scenery Switzerland is the most noted summer resort of Europe, and the entertainment of visitors is one of the leading occupations of the people. There are many hotels and fine roads; and some of the lower mountain tops may be reached by rail. Every summer many Americans cross the ocean to enjoy the Swiss scenery.

REVIEW QUESTIONS. — (1) What are the principal physiographic features? (2) How does the temperature vary? (3) What about the rainfall? (4) Tell about the glaciers. (5) Give reasons why the Swiss have been able to maintain their independence. (6) What about their language? (7) What about raw materials? (8) Give reasons for the development of manufacturing. (9) For what is Zurich important? (10) Tell about the St. Gothard Tunnel. (11) Tell about (*a*) Basel, (*b*) Geneva, (*c*) Berne. (12) Why do so many tourists visit Switzerland?

SUGGESTIONS. — (1) What other factors besides altitude cause great variety of climate in Switzerland? (2) How may the lakes act as filters and regulators for the rivers? (3) The Rhone enters Lake Geneva laden with sediment derived from the glaciers; but it leaves the lake clear of sediment. By such deposits extensive deltas are built in all of the lakes. Of what value is that fact? (4) What special reasons are there for giving particular attention to the study of English and other foreign languages in the Swiss schools? (5) Why has Switzerland, unlike many European countries, not come into possession of colonies? (6) Find the meaning of referendum and popular initiative in Swiss legislation. (7) Why should Switzerland be selected as a place of refuge by persecuted people and political refugees from other nations? (8) Why did Calvin take refuge in Switzerland? (9) Read that portion of the story of William Tell which is supposed to have occurred about Lake Lucerne. (10) Find out about Louis Agassiz: where born; where he later lived; and what he did to establish his explanation of the Great Ice Age.

FOR REFERENCES, see Teacher's Book.

X. ITALY

Map Questions (Fig. 439). — (1) Of what does the shape of Italy remind you? (2) How does its latitude compare with that of Spain? (3) What neighboring islands belong to it? (4) Point out the principal river. (5) How are the lofty mountains in the north likely to affect the climate? (6) What countries border Italy? (7) What seas border the peninsula? (8) How does its position seem to be advantageous for commerce?

Extent and Position. — Italy is "the very heart of the Mediterranean lands, and plays a great part as a link in the chain of communication between northwestern Europe and the Far East." For example, mails from London to India go by rail to Brindisi in southeastern Italy, and thence by steamer. What countries in Africa lie nearest to Italy? (Fig. 511.) Estimate the distance to them.

The area of Italy, including the islands of Sicily and Sardinia, is only a little greater than that of Colorado, but its population is about 32,000,000. It is the smallest of the six Great Powers, but is the most densely populated of any excepting the United Kingdom. Name the Powers.

People and Government. — The inhabitants of Italy are a mixture of many peoples. In early times, the central position of the Italian peninsula was of importance in aiding the government at Rome to control the lands bordering on the Mediterranean Sea. At that time people from the surrounding lands of Europe, Asia, and Africa were brought to the peninsula, often as slaves captured in war. Later, when the power of the Roman Empire was weakened, hordes of barbarians invaded Italy. Nevertheless, the permanent settlers have invariably been won over to one language; and Italian, which is a growth out of the speech of the ancient Romans, is now the universal tongue.

For centuries after the fall of Rome, Italy was broken up into a number of separate and independent kingdoms; but here, as in other countries, the tendency of recent times has been toward unity. In 1860 several of the independent states united to form the kingdom of Italy; and later others were added until, in 1870, or about the

same time that the German Empire was formed (p. 418), the present kingdom was established with ROME as its capital. Like most of the European countries, Italy is governed by a limited, or constitutional, monarchy.

Physiography and Climate. — The Italian peninsula is mountainous throughout most of its extent. In the north are the Alps, some of whose highest peaks are on the boundary line between Italy and Switzerland. The Alpine ranges curve around in northwestern Italy and join the Appennines, which extend the entire length of the peninsula and form its very backbone. The principal lowlands, therefore, are the narrow coastal plains and the broad Po valley.

We think of Italy as a sunny land of flowers, although Milan and Venice are on nearly the same parallel as Montreal. One reason for the pleasant climate is that the lofty Alps form a great wall which cuts off the cold north winds. Another reason is that the peninsula is under the equalizing influence of the Mediterranean, whose waters have a temperature of over 50°. On these accounts the Italian winters are mild, and in the extreme south the temperature seldom falls to the freezing point.

FIG. 445.
An Italian team at Naples.

Much of Italy has an abundance of rain; but, excepting in the north, the greater part comes in winter. The summer drought is due to the fact that the horse-latitude belt moves northward in summer (p. 263); therefore southern Italy at that season resembles southern Spain in climate.

Agriculture. — Such a climate, together with a fertile soil, helps to explain why agriculture is the principal industry in Italy. Among the products are many that thrive in semi-tropical climates, as well

as others that are common in the countries of northern Europe. The climate is so favorable that, by the aid of irrigation, from four to ten crops may be raised in a year.

The most extensive farming district is the fertile plain of the Po basin. There is an abundance of rainfall; yet the people depend upon irrigation more extensively than in any other part of Europe. There are several reasons for such extensive irrigation. In the first place, the fact that the tributaries have their sources in the mountains, and often in the glaciers and snows of the Alps, insures a permanent supply of water to the gently sloping land. Besides this, the rivers frequently flow through lakes — some of them among the most beautiful in the world — which act as great reservoirs for water supply.

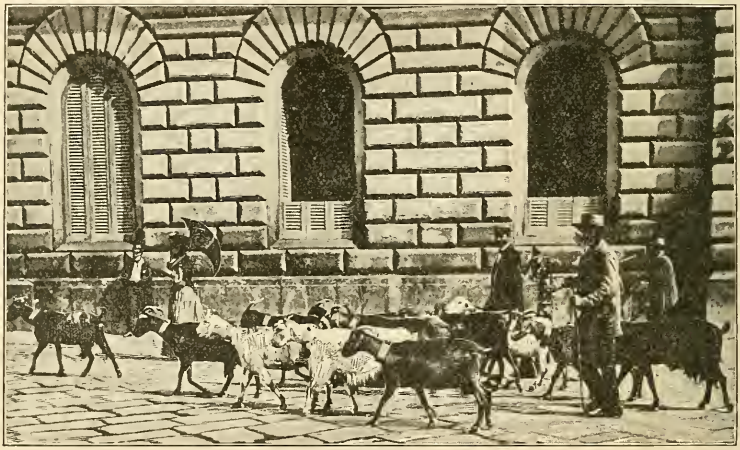


FIG. 446.

A herd of goats in the streets of Naples. These are driven about the city, and even into the houses, to be milked,

Where irrigation is so easy, the extensive cultivation of rice is possible. This is an important crop in northern Italy, but corn and wheat are raised in still greater quantities. Grapes are cultivated to such an extent that Italy ranks second among the wine-producing countries of the world; and so many silk-worms are reared that raw silk is the most valuable export of the country. Among the other important products are eggs, which are exported in large quantities; also olives, oranges, lemons, flax, hemp, and wool.

Mining and Fishing. — There is a little iron, zinc, and copper ore; but one of the most important mineral products is the sulphur of Sicily; indeed, until a few years ago this island produced most of the sulphur used in the world. Another important mineral product is marble, of such rare beauty that it is prized the world over.

The fishing industry is important; but the fish of the Mediterranean are quite different from those of the North Atlantic. Among the peculiar products of the sea are precious coral and sponges. You will remember that we found sponge fishing important also among the Bahama Islands east of Florida.

Manufacturing. — As in Switzerland, electricity generated by water power supplies the place of coal to some extent. Consequently there is more manufacturing than one might infer from the lack of fuel. While much raw silk is produced, and there is some silk manufacturing, a large part of the silk is sent to France, Switzerland, and elsewhere, to be made into cloth. There are also factories for woollen, cotton, and flax weaving, and for other purposes.

Most European countries take pride in their fine art galleries; but Italy far surpasses them all and is the very storehouse of art, whether architecture, painting, or sculpture be considered. Accordingly, the characteristic manufactured articles are those of an artistic nature, as glass work, lace, earthenware, statuary, wood carving, coral carving, and straw plaiting. In what other country have we found that the artistic taste of the people greatly affects their manufactures?

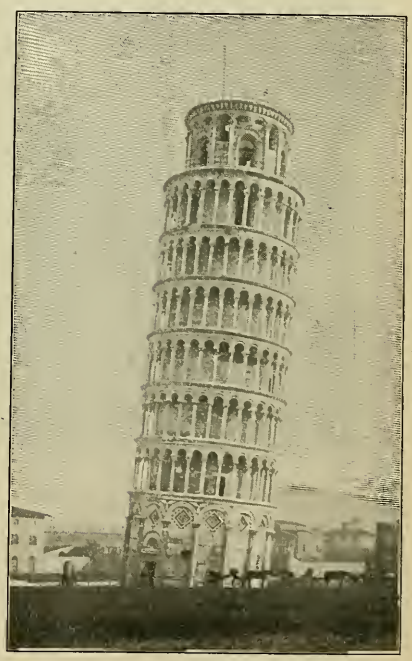


FIG. 447.
The leaning tower of Pisa, which has become tilted because of settling on one side.

Principal Cities. — Estimate the average width of the Italian peninsula. Since it possesses many excellent harbors, we may ex-

pect to find numerous large cities along the coast, as in Great Britain.

Naples and Vicinity. — The most populous city is NAPLES in the southern part of the peninsula. The semicircular bay on which it is situated presents one of the most magnificent sights in the world. On the northwest is the city itself, — about the size of Boston, — rising upon an amphitheatre of hills ; toward the east is Mt. Vesuvius (Fig. 448), with the crests of the Appennines in the distant background ; and on the southeast is a steep, rocky coast, behind which are numerous villages partly concealed among groves of orange, lemon, and palm trees.

FIG. 448.
A view of Vesuvius, with a part of Pompeii in the foreground.

This is one of the most fertile sections of Italy, — thanks to the ashes that have been thrown out of Vesuvius, — and the agricultural population is one of the densest in Europe. The harbor, too, is good, so that there is more shipping here than in any other Italian port with the exception of Genoa. But the secret of so large a city in this agricultural region is found partly in the peculiar character of Italians, who feel a dread of isolated homes such as are common throughout the farming districts of the United States. Consequently they crowd into the villages and cities, even though they must travel a long distance to their field of work, or must suffer now and then from extreme want.

Within plain sight of Naples stands Mt. Vesuvius, a cone of lava and ashes nearly a mile in height, from whose crater volumes of steam constantly pour forth. At the time of Christ the slopes of this mountain were dotted with productive farms, while thriving towns spread over the country at its base. But in the year 79 an appalling eruption took place which completely buried Pompeii, Herculaneum, and many villages beneath showers of ashes and streams of volcanic mud. Since then many eruptions have been recorded, the last violent one occurring in 1872. During the last half-century the buried cities, especially Pompeii, have been unearthed at great labor and cost. By these excavations much has been learned about the buildings and customs of the people who lived nearly two thousand years ago.

At present, tourists daily ascend to the top of Vesuvius. There they see one of the most awful sights in the world when they cautiously approach to the very edge of the crater — an opening perhaps a fourth of a mile across — and peer down into the abyss. Reports like the thunderings of cannon come from far below, and lumps of lava as large as a man's head are often hurled upward. Not seldom lava lumps rise above the mouth of the opening and fall here and there outside, making one's visit all the more exciting by the slight danger of being hit.

Ancient and Modern Rome. — By far the most interesting spot in Italy is ROME, the "Eternal City," long the capital of the ancient world, afterward of the empire of the Popes, and now of Italy.

The site of Rome was well chosen. It lies near the centre of the Mediterranean, and near the centre of the Italian peninsula as well. In that part of Italy the fertile coastal plains are broad and are intersected by the Tiber, the largest river of the country except the Po. In that vicinity, also, the Appennines reach their highest altitude, which insures abundant water supply for the Tiber and for the plains. Moreover, the valley of the Tiber offers one of the most convenient routes across the peninsula. These are some of the advantages that attracted to ancient Rome a population of fully a million, and caused the surrounding country to be thickly settled and carefully tilled.

Now, however, the city contains less than half as many inhabitants, while the neighboring plains for miles around, though beautiful pasture land, have scarcely a tree or a house upon them. The reason for

this lack of suburban life is the very prevalent malaria. At present, the country is of use for little else than grazing; and as summer approaches even the herdsmen flee with their cattle and sheep to the mountains.

But while agriculture and commerce do not flourish near Rome, fine residences, public buildings, art galleries, and notable ruins are numerous in the city. The dome of *St. Peter's* — the largest and most famous church

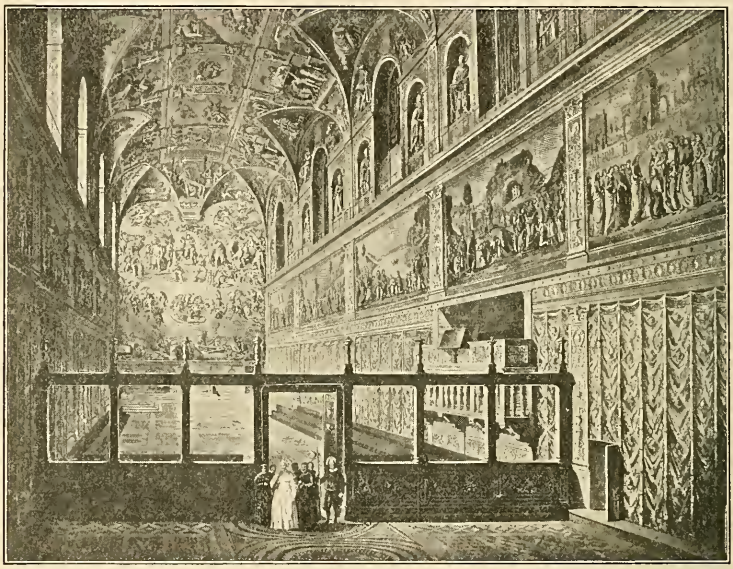


Fig. 449.

The Sistine Chapel in the Vatican, where the Pope lives.

in the world — towers above everything else; and the *Vatican*, where the Pope resides, is the largest palace in Christendom. In the Vatican are some of the finest and most beautiful of paintings (Fig. 449).

The ruins of ancient Rome vie in interest with these products of later Rome, and cover so many acres that the city is almost as much a tomb as a living city. The most conspicuous relic of the past is the *Colosseum* (Fig. 450), a huge, oval-shaped theatre, open to the sky, with seats for forty or fifty thousand persons. In the days of the Roman Empire it was used to witness life and death struggles between men, and between men and wild beasts.

The *Forum* is another extensive ruin within the city limits. It was

the great public square, on a lowland between some hills; but its monuments, arches, and other ornaments were covered with rubbish during the centuries succeeding the fall of the Empire. The excavation of this famous spot has not yet been completed, whole buildings, as well as smaller objects, having been buried in that locality.

Other Italian Cities. — With the exception of Rome and Naples the large cities of the Italian peninsula are in the northern part. The principal city south of Naples is PALERMO, the capital of Sicily, and about the size of Detroit. It is situated in the midst of extensive fruit groves. What fruits would you expect to find there?

The first large city north of Rome is FLORENCE, on the western base of the Appennines at a junction of roads across the mountains.

FIG. 450.
Ruins of the Colosseum, at Rome.

Straw plaiting, mosaic work, and silk manufacturing are important Florentine industries; and the city is famous for its art galleries.

MILAN, the third Italian city in size, owes its importance largely to its location at the crossing of roads running east and west in the Po Valley, and north and south over the Alps. TURIN has flourished for a similar reason. From very early times these cities have been important trade centres because of their location at the crossing of trade routes in a fertile, densely populated valley. The railways across the Alps (p. 435) have greatly increased their importance.

MILAN possesses a magnificent cathedral built of white marble and adorned with more than a hundred spires and fully four thousand

statues. On the wall of an old monastery in Milan is Da Vinci's famous painting, "The Last Supper," copies of which are often seen in our homes. The city is the centre of the silk trade, and manufactures much cutlery.

Genoa, although separated from the Po Valley by the low Appennines, is the natural port of Milan and Turin. Since it is a port of outlet for so fertile a region, and is now connected with central Europe by railway (p. 435), this city is the most important seaport in Italy.

The principal seaport of the Adriatic is Venice, one of the most interesting European cities. When hordes of barbarians were invading Italy, some of the residents retreated to a number of small islands in a lagoon, protected from the sea waves by low sand bars. The people developed into a hardy, independent race, largely through contact with the sea. Their very position forced them to become sailors; and the site of their city was favorable for commerce between central Europe and the East. Protected from attack by land, Venice rose in power, and with power came wealth. Many beautiful houses, churches, palaces, and museums are reminders of the ancient splendor.

Fig. 451.

A view of a part of Venice.

The city is built upon more than a hundred small islands, about two and a half miles from the mainland, with which it is now connected by railway. Naturally, canals take the place of streets. There are one hundred and fifty canals, the main one, or Grand Canal, being flanked on either side by fine residences, whose steps lead down into the water. All together nearly four hundred bridges join the different islands, and there are many narrow footpaths, but since the chief thoroughfares are canals, *gondolas* (Fig. 453) take the place of wagons, carriages, and street cars. No doubt thousands of children in that city have never seen a horse.

San Marino and Malta. — *San Marino*, although surrounded by lands that belong to the kingdom of Italy, is, like Andorra (p. 394), a tiny, independent republic. It is the oldest and smallest republic in the world, and owes its independence partly to the fact that the city is on a high hill and, therefore, difficult to capture.

South of Sicily is the small island of *Malta* (Fig. 415), which, like Gibraltar, belongs to Great Britain, and is strongly fortified.

FIG. 452.

A gondola in Venice — the ducal palace, or palace of the Doges, is seen on the farther side.

REVIEW QUESTIONS. — (1) In what respects is Italy's position favorable? (2) What about the size of the peninsula? (3) Tell about the origin of the people. (4) Tell about the government (5) What are the principal features of the physiography? (6) What factors equalize the temperature? (7) Tell about the rainfall. (8) What crops are raised? (9) Of what value is irrigation? (10) What conditions especially favor it in the Po Valley? (11) Name the leading agricultural products. (12) What mineral products come from Italy? (13) What other raw products? (14) What about manufacturing? (15) Write from memory a brief description of Naples and vicinity, including Vesuvius and Pompeii. (16) Give the reasons for the location of Rome. (17) What changes have occurred since the days of the Roman Empire? (18) Tell the principal facts about each of the following cities: (*a*) Palermo, (*b*) Florence, (*c*) Milan, (*d*) Turin, (*e*) Genoa, (*f*) Venice. (19) Tell about San Marino and Malta.

(1) Why should Italy have been relatively much more important in former times than now? (2) What colonies has Italy in eastern Africa? Suggest reasons why Italy has so few colonies. (3) What must have been the influence upon Genoa and Venice of the discovery of the ocean route to India? Why? (4) What must have been the influence of the opening of the Suez Canal? Why? (5) Would you expect that Italy would have a large navy? Find out how her navy ranks with those of the other five Great Powers; with that of the United States.

XI. AUSTRIA–HUNGARY

Map Questions (Fig. 439). — (1) Compare Austria-Hungary with Germany in area. (2) Compare the two countries in population. (3) Compare the two in number of large cities. In which, therefore, would you expect to find most development? (4) About what proportion of the boundary is formed by water? (5) What countries border this empire? (6) What portions are mountainous? (7) What would you say about the variety of climate? (8) What sections do not belong to the Danube basin?

Physiography and Climate. — A large proportion of the boundary line of Austria-Hungary is determined by mountain ranges. Point out these ranges. Notice that the Russian boundary extends across an open plain. This plain is Austria's share of Poland, a kingdom which once extended from the Baltic Sea to the Carpathian Mountains. Poland was conquered and divided between Austria, Prussia, and Russia, Austria receiving the smallest share and Russia the largest.

Fig. 453.
A street in a small Alpine village of western Austria.

Austria-Hungary is one of the most mountainous countries in Europe. It includes the eastern half of the Alps (Fig. 453), besides several other ranges. These mountains together form a circle enclosing a broad plain (Fig. 454), through which the Danube River flows. At two points this circle

is completely broken : once near Vienna, where the Danube enters the great Hungarian plain (Fig. 439), and again on the southeastern boundary, where the river leaves the plain.

The Danube Valley is the great trade route of Austria-Hungary, since it offers the best passageway through the mountains. The fact that the river is navigable from Germany to its mouth adds greatly to the value of this route. On the southeastern border, where the river passes through the mountains in a deep gorge, there is a point,

FIG. 454.

The Danube where it flows through the Hungarian plain.

known as the " Iron Gate," where the water flows with rapid current ; but a ship canal, cut on one side of the river, now leads around these rapids.

Transportation is all the more confined to the river route because of the peculiar coast line of Austria-Hungary. Although the country is next in size to Russia among European nations, it has only a small amount of coast. Estimate its length. There are numerous harbors, to be sure, but they are difficult of access from the interior, because of the rugged mountains that rise from the very seashore. At only two points on the Adriatic can good harbors be reached from the Danube lowlands without difficulty. What cities are located at these points ?

In so mountainous a country there is naturally much variation both in rainfall and in temperature. Everywhere excepting on the higher mountains, however, the temperature is favorable for the growth of grains and other crops of temperate latitudes. That is,

the summers are warm and the winters are cold; but the extremes are much greater than in England. Why? The rainfall of the lowlands, which averages little over twenty inches, is barely sufficient for agriculture, and the plains of Hungary are subject to serious drought in summer.

People and Government. — Such a rugged surface, with many enclosed valleys, separates the people and favors the development of very different customs amongst the inhabitants of different sections. Moreover, the ease of approach from the north and east has led to repeated invasions from these directions. The result has been that the empire of Austria-Hungary is a mixture of many peoples. Germanic people, who form about a fourth of the entire population, are most numerous in Austria; while the Magyars, a race allied to the Mongolian, form nearly half the population of Hungary; but races related to the Slavs of Russia are more numerous than either of the other groups. There are, in addition, large numbers allied to the Italians and other peoples (Fig. 455). German is the official language and is spoken by the educated classes.

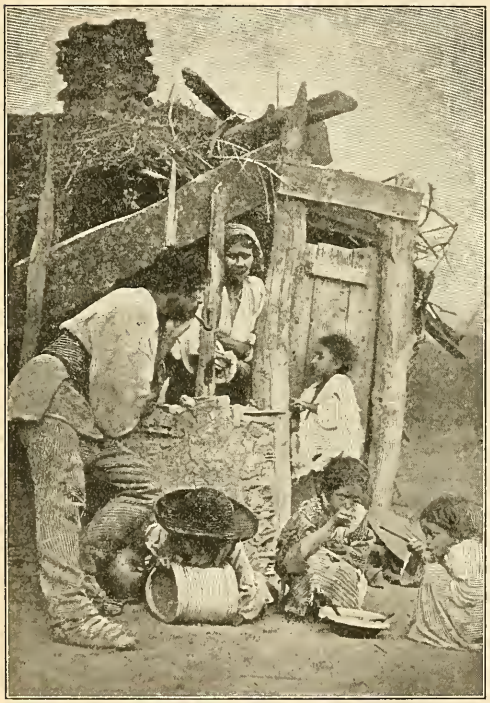


Fig. 455.

A Gypsy family and hut in Austria-Hungary.

There are at least a dozen languages in the empire, and often two or three are spoken in a single town. To be sure, a similar statement might be made in regard to the United States, for we certainly have a great

variety of languages. But no matter from what part of the earth our citizens have come, they have, in most cases, greatly modified their former customs and have become genuine Americans in spirit. The principal exception are the Chinamen, who, instead of identifying themselves with us, remain Chinamen as long as they live.

The many distinct peoples of Austria-Hungary resemble the Chinamen in their tendency to remain apart. They are not only dissimilar in religion, ambitions, and customs, but their interests are often conflicting; and they are jealous and suspicious of, and often hostile to, one another.

FIG. 456.
The Parliament building at Vienna.

It has been a difficult matter to bring these people under a common rule. Nevertheless, in 1867, the Austrian Empire and the kingdom of Hungary were united under Emperor Joseph to form the empire of Austria-Hungary. Each of the countries preserves its own constitution, makes its own laws, and is independent of the other in many respects, as we found to be the case in Norway and Sweden (p. 399). But they work together in matters of common interest, such as the army and navy, foreign affairs, and finance.

Natural Resources. — Many of the mountain slopes are forest-covered, and in the remoter parts wild animals are still found. Since nearly one-third of the empire is wooded, lumber forms one of the important resources of the country.

Where the woods have been cleared away, there are pastures for sheep and goats. Cattle are also raised, especially on the lowlands.

Near the Adriatic and in the warmer valleys there are many vineyards; and the mulberry is raised for the silk-worm, as in Italy (p. 440) and southern France (p. 385). Flax, hemp, corn, sugar beets, and tobacco are other important crops. But the grains, especially wheat, rye, barley, and oats, are the staple agricultural products of both Austria and Hungary. The broad plains of the Danube (Fig. 454) form one of the leading wheat-producing regions of Europe. A large amount of this grain is exported, since the people, like the Germans, live much upon rye bread.

There is much mineral wealth in the mountains, including deposits of salt, gold, silver, lead, mercury, and copper. The Hungarian opal is celebrated for its beauty; and the excellent quality of the clays has made possible the manufacture of fine porcelain ware. The mineral quartz supplies the material for the Bohemian glass blowers, who make some of the finest ware in the world.

Iron is widely distributed (Fig. 366), and Austria-Hungary ranks third among the coal-producing countries of Europe. Some of the best deposits are in the northwest, near PRAGUE, which explains why that city is extensively engaged in iron manufacturing.

Manufacturing and Commerce. — Austria-Hungary does not manufacture nearly as much as Great Britain, Germany, or France. Owing partly to the poor facilities for commerce, and partly to lack of education and common interests among the people, there has been far less development of manufactoring than might be expected.

Much of the manufacturing is still done either by hand or by very simple machines. But there has been great progress in recent years, and numerous cotton, woollen, flour, and paper mills, iron manufacturies, and beet-sugar refineries have been set up. There is also silk weaving. On the whole, the chief manufacturing region is in the northwest, next to Germany, while the principal agricultural section is in the central and eastern parts.

There is an extensive internal commerce along the rivers and the railways; but, owing to the limited coast line, ocean commerce is much less developed than in other large European nations. Austria-Hungary has, in fact, a smaller merchant marine than Greece.

The most natural trade route leads either down the Danube into the Black Sea or else westward into Germany, and thence down the Rhine Valley. Why in these directions? Less than one-third of the foreign shipping goes by way of Trieste. This means that the greater part of the foreign trade of the empire is carried on through foreign ports. What disadvantages do you see in that fact? Trace the chief routes.

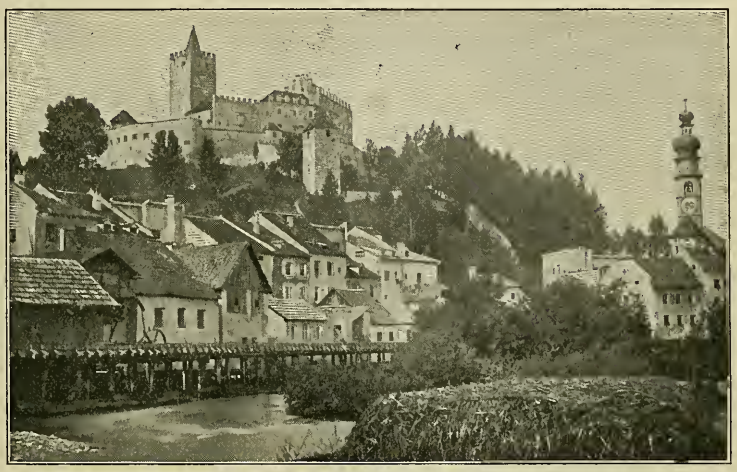


FIG. 457.

Cut showing a castle in Austria, a little village at the base of the hill, and a mill at the left. Notice the thick walls, formerly of use to protect the castle from attack.

Principal Cities. — While there are many small cities in this empire, there are surprisingly few large ones. The two largest, VIENNA, the capital of Austria, and BUDAPEST, the capital of Hungary, are on the Danube River and not on the seacoast. Suggest reasons.

VIENNA, which is larger than Philadelphia, is the greatest city in Austria-Hungary and the fourth largest in Europe. The reason for its size is found first of all in its location, on a large river in the central part of Europe. Moreover, it is situated at an opening between mountains, through which, from the earliest times, the best routes have passed from western Europe to Asia, and from northern Europe to the Mediterranean. The railways which lead from St. Petersburg to Rome, and from Berlin and Paris to Constantinople, converge toward this point, making the city a great railway and trade centre.

Budapest, consisting of two towns (Buda and Pest) on opposite banks of the Danube, is the seat of the Hungarian government and the home of the emperor for a part of each year. These twin cities are located at a point where the Danube is easily bridged; but Budapest has not so fine a location as Vienna and is only about one-third as large. The city is in the midst of the great wheat-raising plains of the Danube, and, like Odessa on the Black Sea, extensively engaged in flour manufacture and grain shipment.

Prague, the third city of Austria-Hungary, is situated on the navigable Elbe, which since early times has been an important trade route. Located in the midst of a rich mineral region, it is a noted manufacturing centre. Trieste, a city about the size of Rochester, New York, is the largest Austrian seaport. Although separated from the main part of the country by mountain ranges, it is connected with the interior by a railway. Even as far back as the time of the Romans, the pass which the railway takes in crossing the mountains was followed as the route of entrance to the Danube Valley. Fiume, southeast of Trieste, has an excellent harbor and is rapidly growing as a port of export for Hungary.

Small Countries. — On the boundary between Austria and Switzerland is *Liechtenstein*, a very small independent country united with Austria-Hungary by a customs treaty. Two other countries, *Bosnia* and *Herzegovina*, formerly parts of Turkey, are now practically a part of Austria-Hungary, and are therefore not marked separately on our maps. They include the mountainous land northwest of Montenegro and Servia.

Review Questions. — (1) Tell about the physiography of Austria-Hungary. (2) Tell about the climate. (3) What is the condition of the people? (4) What about the government? (5) Name the principal raw products. (6) What is the condition of manufacturing? (7) What about the commerce? (8) Give reasons for the location of Vienna. (9) Tell about the following cities: (*a*) Budapest, (*b*) Prague, (*c*) Trieste, (*d*) Fiume. (10) What is said about small countries?

Suggestions. — (1) How must the construction of tunnels through the Alps have affected Austria-Hungary? (2) What would you say as to the relative importance of the Danube and Rhine rivers? (3) Find some Bohemian glass to see how beautiful it is. (4) In an atlas look up Austria-Hungary to find the portions which are called Tyrol, Moravia, Bohemia, and Transylvania. (5) Look up some facts about the history of Poland. (6) Suggest reasons for the absence of Austrian colonies. (7) Find out something about the Triple Alliance. (8) Read about the influence of Emperor Francis Joseph in holding the different parts of the empire together. (9) Find out something about Kossuth.

XII. THE BALKAN PENINSULA

Map Questions (Fig. 439). — (1) What countries border Roumania? (2) Name the countries south of the Danube. (3) What does the map tell you about the surface of each? (4) What may you expect about the variations in climate on this peninsula? Why? About the rainfall? Why? (5) Compare the number of large cities with the number in Germany and Italy. What inferences do you draw concerning the condition of the people? (6) Compare the area of Turkey in Europe with that of your own state.

Physiography and Climate. — This double-pointed peninsula is bounded on one side by the Adriatic and Mediterranean seas, on the other by the Ægean and Black seas. It is unlike other European peninsulas in having a very long land boundary. Trace it. Throughout almost its entire extent the surface is mountainous, which offers an explanation of the large number of separate countries on the peninsula. How? Many of the valleys are suitable to agriculture, the most extensive being the plains of the Danube in Roumania and Bulgaria.

Fig. 458.
A view in Bulgaria, showing its rugged surface.

The climate varies greatly from mountain to valley and from interior to seashore. Along the southern coast the winters are mild, as elsewhere near the Mediterranean; but in the northeast, near Russia, hot summers are followed by cold winters, when icy winds sweep down from the Russian steppes, and the Danube freezes over.

In so mountainous a land there is also much variation in rainfall. On the western slopes, for example near the shores of the Adriatic,

there is an abundance of rain; but on the east coast and in the interior valleys, especially in Greece, there is so little rain that agriculture depends upon irrigation. Why is this true of Greece particularly? (p. 342).

People. — The eastern point of the Balkan peninsula comes so close to Asia that it has been called a "bridge" between Europe and Asia. At each of two points, the Dardanelles and the Bosporus, the continents are separated only by a narrow strait, a barrier so slight that the animals and plants of the country belong to both European and Asiatic species. This region has also been a bridge for the passage of many peoples. Romans, various tribes of Slavs, and finally the Mohammedan Turks from Asia have brought the peninsula under their dominion. Wherever the Turks went they brought ruin; and for four centuries, while the rest of Europe was advancing, they held this region in subjection and prevented progress. During the nineteenth century, however, many of its people have thrown off the Turkish yoke, so that Turkey in Europe is now less than one-quarter as large as it was a hundred years ago. Nevertheless, the effects of long Turkish misgovernment are clearly seen throughout the entire peninsula.

Fig. 459.
A Roumanian peasant.

Aside from Roumania, five nations now occupy the Balkan peninsula: Montenegro, Servia, Bulgaria, the Ottoman Empire or Turkey, and Greece; and two others, Bosnia and Herzegovina, are under control of Austria-Hungary (p. 454).

Montenegro. — This tiny principality, which is smaller than the state of Connecticut, has maintained its independence largely because of its situation among the mountains. The country is of slight importance; its soil is so poor that there is little agriculture; there is less manufacturing, and not a single railway. The principal occupation is cattle raising.

Servia. — Bordering on southern Hungary, Servia shares some of the advantages of that country, including navigation of the

Danube. Since much of its surface is rugged and heavily forested, only a small portion is cultivated. Among the leading products are corn, wheat, and other grains, reminding us of Hungary. There is also much fruit raising, particularly that of grapes and plums, which, when dried, are sold as raisins and prunes. Many cattle, sheep, and pigs are raised for export, the pigs being allowed to roam in the oak and beech forests. Why there?

The resources of Servia are only partially developed. For example, although coal, iron, lead, silver, and other metals are known to exist, there is very little mining and not much manufacturing. It will require more time to recover from the centuries of Turkish misrule.

The capital of the kingdom is BELGRADE, a city finely situated upon the Danube.

FIG. 460.
A Turkish lady, at Constantinople, in street dress.

Roumania and Bulgaria. — These two countries have much in common. Although the Danube separates them for a long distance, they together control its lower course. This is a fact of much importance to Austria-Hungary. Why? Broad plains suited to agriculture border the Danube in both countries, though the plains are far more extensive in Roumania than in Bulgaria. Naturally, therefore, there is much farming. While each of these kingdoms has been freed from Turkish rule, Bulgaria is still tributary to that country; that is, although in most respects independent and self-governing, it is obliged to pay an annual tribute in money to Turkey.

In both countries wheat and other grains are among the chief crops. But the warmer climate of Bulgaria, south of the Balkan Mountains, permits the culture of products that cannot be raised

extensively in Roumania; for example, the mulberry for silk, and roses for the valuable perfume, attar of roses. Many sheep as well as other live stock are raised in each country; in fact, herding is almost the sole industry on the barren steppes of eastern Roumania. There are large tracts of forest in each, but there is more in Bulgaria, owing to its rugged surface, than in Roumania. Each country has valuable mineral deposits; but, as in Servia, there is little mining. Why? Nor is there much manufacturing, excepting such hand work as the manufacture of Turkish rugs.

With so slight development of the resources, there are few large cities. By far the largest is BUCHAREST, the capital of Roumania. Find the capital of Bulgaria.

FIG. 461.

Map showing the location of Constantinople.

Turkey in Europe. — The Turks, who are Mohammedans, are controlled by ideas very unlike those of other Europeans. They are unprogressive and inclined to grant no rights to Christians, many of whom still live in Turkey. Their ruler or *Sultan* has absolute power, which he exercises with little conscience, and the government is the worst in Europe.

Not only are the mass of Turks in ignorance and poverty, but they are not encouraged to develop the resources of their land. There are valuable mineral deposits, practically unworked; the great forest tracts have been nearly destroyed; and broad areas of farm land are cultivated by the use of oxen and tame buffaloes, and by the crude methods of early centuries. Among the principal crops are wheat, corn, flax, hemp, and tobacco. Figs, and grapes for raisins, are also raised. Cattle and sheep are numerous.

As in other slightly developed states, there is little production beyond raw materials; and while other nations in Europe have rapidly developed in manufacturing, Turkey produces chiefly hand-made goods. Among the latter are the famous Turkish rugs, and some very beautiful articles in leather and metal, showing that the Turks have much artistic skill. With so little industry there is naturally almost no means of transportation; in fact, the roads are everywhere bad, and railways are almost lacking.

CONSTANTINOPLE, the capital of the Ottoman Empire, has been famous for many centuries. Being situated on the Bosporus, where the beautiful, river-like outlet of the Black Sea passes through a valley in the low plateau, it commands the channel through which the commerce of the Black Sea must pass. This is a natural site for a city; for in addition to its location on this water route, it is the point where the crossing can best be made from Europe to Asia. The presence of a harbor on the European side — a small bay at the river mouth called the "Golden Horn" — and the fact that the founders were Europeans trading in Asia, rather than Asiatics trading in Europe, are reasons why a large city has grown on the European and not on the Asiatic side.

FIG. 462.

St. Sophia, a beautiful church in Constantinople now used as a Mohammedan mosque. This illustrates the Byzantine style of architecture — Byzantium having been the early name of Constantinople.

Greece. — The southern end of the Balkan peninsula is occupied by Greece. Owing to the many short mountain ranges extending in different directions, the coast line is irregular, with numerous peninsulas, islands, deep bays, and fine harbors, formed by the sinking of the irregular land. The influence of the Mediterranean causes a warm, pleasant climate, as in southern Italy; and the rainfall, which is moderate in winter, is so light in summer that irrigation is neces-

sary for agriculture. The surface is so rough and rocky that large sections are unfit for farming.

It was in this small peninsula, under what to our eyes appear to be very unfavorable conditions, that the marvellous civilization of ancient *Hellas*, or Greece, was developed (p. 344). But these conditions really had the tendency to develop strong intellectual powers and brave men. The sea and mountains protected the races from invasion, and the many fine harbors and inlets permitted constant intercourse by water. By the commerce which thus arose the Greeks became so acquainted with the sea that they were almost as much at home upon it as upon the land.

Fig. 463.
A Greek peasant costume.

In all parts of the world it has been under such general conditions as these that strong races have been evolved. It was true in Scandinavia, in the British Isles, and in the Spanish and Italian peninsulas. It is also true in the Japanese Islands, the home of the most highly developed Asiatics.

Because of their ability to navigate the inland seas, the European Greeks, in very early times, carried on constant communication with the people from whom they had separated, and who still dwelt opposite them, on the coast of Asia. The arts and customs of their mother country they improved upon, and in time became the greatest power in the then known world. They developed an art and a civilization which, with all our advancement, we have not been able to excel. They also became explorers, and cruised about the entire shores of the Mediterranean at a time when most of Europe was occupied by savages or barbarians. They entered into trade relations with their neighbors, taught them Greek arts, and established many colonies. Greek arts and literature, we should note, decayed with the loss of freedom in the Greek cities which were conquered by barbarians from the north.

Through colonies in the Italian peninsula, and also through the immigration of individual Greeks, this people exerted a strong influence upon the Romans. Rome finally conquered Greece,

FIG. 464.

A view of the Acropolis at Athens. The city lies back of the hill.

although much of Roman civilization, and therefore the civilization of Europe, was due to Greek thought. After the decline of the Roman Empire other northern peoples devastated Greece, and finally the Turks entered and carried ruin to this as to other parts of the Balkan peninsula. Greece is now independent and governed as a limited monarchy.

FIG. 465.

A shepherd and sheep in Greece.

In this little country there are few natural resources. There is no coal, and therefore little manufacturing. There is some mining, as of lead and zinc; but the principal occupations are herding and agriculture. Large numbers of sheep and goats are raised; and the chief farm products are grain, tobacco, olives, and fruits. Among the latter is the small variety of grape, known as the currant. These, together with raisin grapes, are

cultivated in large quantities on the steep hillsides and, after being gathered, are dried in the warm, dry summer air.

The neighborhood of the sea has led the Greeks to continue their seafaring life, and they still carry on an extensive foreign trade. Many are also engaged in fisheries, and in securing bath sponges from the shallow sea bottom among the Greek islands.

Athens, the capital and most important city, with about one hundred thousand inhabitants, is situated inland six miles from its port, Piræus. The principal streets of the present city are quite modern, but ruins of the ancient Athens are still numerous. The most noted buildings, and some of the finest temples of ancient Greece, stood upon the Acropolis (Fig. 464), a level-topped rocky hill with precipitous sides. This remarkable stronghold was the natural centre for settlements in the surrounding plain.

Islands near Greece. — The many islands in the neighborhood of Greece re either mountain crests or else volcanic cones. Occasionally we heard of an earthquake shock in this island region or *archipelago*, showing that the mountains are still growing. The largest island near Greece, and the last to be separated from Turkey (1898), is *Crete* (Fig. 415), which, like the smaller islands, is under the control of the Grecian government and inhabited mainly by Greeks. The inhabitants are engaged in industries that are the same as in Greece itself.

Review Questions. — (1) Describe the physiography of the Balkan peninsula. (2) Tell about the climate. (3) State some of the main facts in its history. (4) Name the countries of the peninsula. (5) What can you say about Montenegro? (6) Tell about Servia. (7) In what respects do Bulgaria and Roumania resemble each other? (8) Mention some differences. (9) Locate the capitals. (10) Tell about Turkey in Europe: character of the people; government; resources; manufacturing. (11) What special reasons are there for a large city at Constantinople? (12) Describe Greece: its physiography; climate; reasons for former importance; influence; reasons for decline; present condition; resources. (13) Tell about Athens. (14) What can you tell about the islands near Greece?

Suggestions. — (1) What reasons can you suggest for the fact that these eastern countries are in a constant state of unrest? (2) Turkey is occasionally referred to as the "sick man of Europe." Why? (3) How was Greece finely situated for the trade of the ancient world? (4) Learn some facts about Homer, Plato, Aristotle, and other noted Greeks. (5) Read some of the ancient Greek myths. (6) Read about the defence of the Pass of Thermopylæ. (7) What reasons can you suggest for the fact that ancient Greece was divided into several independent states, not unlike our own, but lacking a federal union?

REVIEW OF EUROPE AND COMPARISON WITH NORTH AMERICA

For area, population, etc., see Appendix

(1) Compare the climate of western Europe with that of the west coast of North America (p. 341). (2) Make the same comparison for the east coast of North America (p. 342). (3) What European countries were covered either wholly or partly by an ice sheet in the Glacial Period? (Fig. 367). (4) Is the coast line of Europe more or less irregular than that of North America? Which continent has the advantage in this respect? How is it an advantage? (5) Name and locate the principal mountain ranges in each continent. Which continent has the advantage as to the direction of the ranges? Why? (p. 343). (6) Name and locate the principal rivers in each continent. Which are the largest? (7) Draw an outline map of Europe inserting the boundaries and names of the countries. (8) How do our larger Western states compare in area with France and Germany? In population? (9) Which are the two or three most progressive countries? Give reasons. (10) What is the prevailing kind of government in Europe? In North America? How do you account for the difference? (11) Which European country has, perhaps, the best location for world commerce? Why? (12) Which is best situated for continental commerce? Why? (p. 417.) (13) Which country of North America has the most favorable position for trade? How? (14) Compare the five largest European cities with the five largest in North America. (15) State the main advantages of the position of each. (16) Name and locate the five largest seaports of Europe (Fig. 415). (17) How do they compare in population with New York, Philadelphia, Boston, Baltimore, and San Francisco? (18) Name and locate the five largest interior cities and compare their population with that of Chicago, St. Louis, Cleveland, Buffalo, and Cincinnati. (19) What cities of Europe and North America are near the 46th parallel of latitude? The 50th? The 60th? (20) Name some agricultural products common to both Europe and the United States? (21) Name others that are found in the United States but not in Europe. Why this difference? (22) In what countries of Europe is silk produced? Why do we not raise silk-worms? (p. 385). (23) In what countries are sugar beets produced extensively? (24) In what countries is most lumber obtained? (25) Make a list of the European countries which have extensive coal deposits. (26) Which countries have little or none? What is the effect on the industries in each case? (27) Which countries have little or no mining? (28) Which countries have important manufacturing industries? Which have very little? Give the reasons for this difference. (29) With which group would the United States be classed with regard to mining and manufacturing? (30) Which of the European nationalities have you seen on our streets? (31) Find in the Statesman's Year-book or elsewhere, the number of men necessary for the standing armies of each of the six Great Powers. How do these armies compare in size with the standing army of the United States? (32) Write a paper stating some of the advantages that we enjoy over European countries. (33) State some of the advantages that they enjoy over us. (35) Which one of the European countries would you prefer to visit? Why?

FIG. 466.

FIG. 467.

A Chinese mandarin in his official dress.

FIG. 468.

A Yakout woman from the cold tundra region of Siberia.

FIG. 469.

MAP QUESTIONS. — (1) Compare the greatest length and breadth of Asia with that of North America (Fig. 000). (2) Compare its area with that of other continents. (*For Areas, see Appendix.*) (3) Where are the mountains; (4) the plains? (5) Draw an outline map of Asia, adding the names and boundaries of the countries. (6) Find four large inland seas and lakes. Which have no outlets? (7) Find the area of China, India, and Siberia. About

how many times as large as Pennsylvania is each? (8) What facts concerning the climate you infer from the map? (9) What does the general absence of railways tell about the development of the people? In what part has there probably been most progress? (10) Name some of the large islands near Asia. Name some of the largest islands between Asia and Australia (Fig. 539).

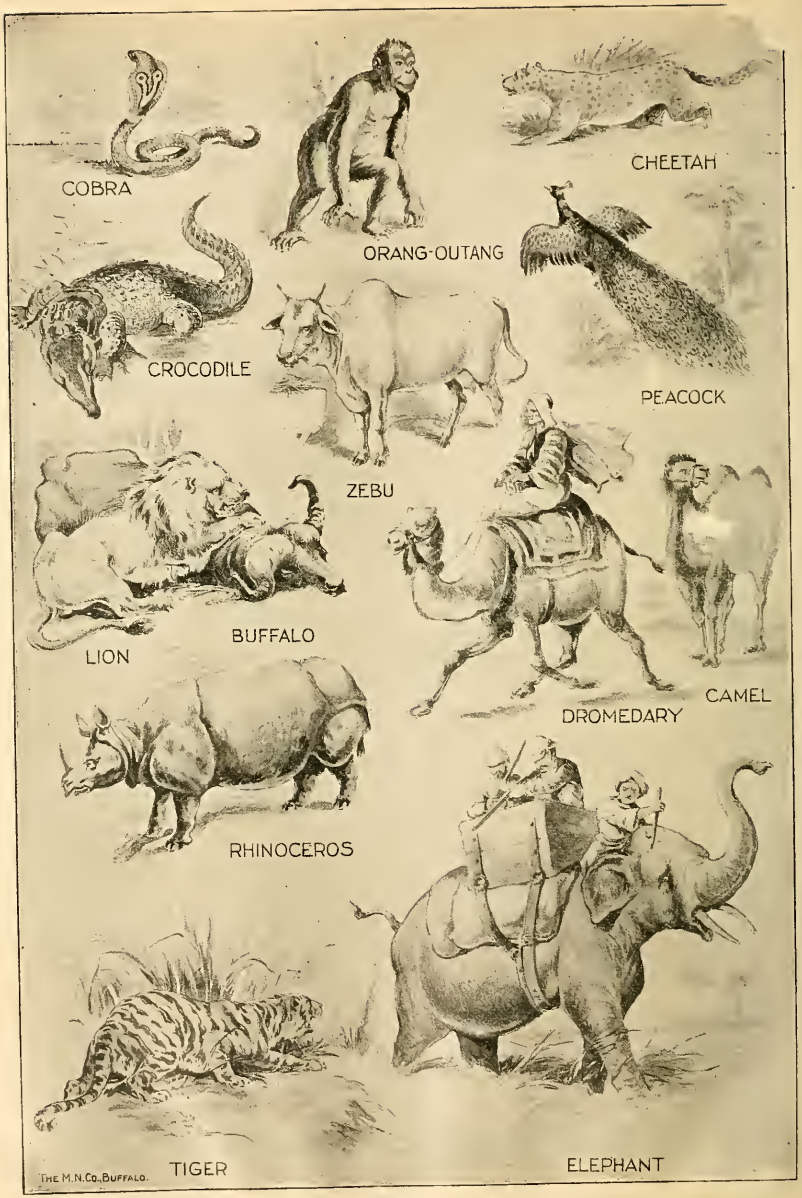


FIG. 470.

Some of the animals of Asia.

Part V

ASIA, AFRICA, AUSTRALIA AND ISLAND GROUPS

I. ASIA

Size and Position. — Asia, the largest of the continents, includes almost one-third of the land of the globe. Its immense size is shown by the fact that it reaches from near the equator to a point halfway between the Arctic Circle and the North Pole. How many degrees is that? How many miles? It is six thousand miles from the Mediterranean Sea to Bering Straits; and so many degrees of longitude are included in Asia that, according to our plan for standard time, one would need to change his watch ten different times in going from one extreme to the other. How many changes are necessary in crossing the United States? (Fig. 42)

This great land mass, which reaches to within fifty miles of North America, is united to Africa by the Isthmus of Suez, while for a long distance the two continents are separated only by the narrow Red Sea. What is its connection with Europe? Why are the two often called Eurasia? (p. 339.) In what zones does Asia lie? Is the same true of any other continent?

Physiography and Climate. (Fig. 473.) — Asia resembles Europe in the irregularity of its mountains. While many of them extend east and west, there are others running nearly north and south. Name some of each. The islands and peninsulas are due to uplift of the earth's crust, while the seas which they enclose occupy depressions between the uplifted parts. Since the mountain growth has

not entirely ceased, many of the islands are still slowly rising; and, as the rocks move and break, earthquake shocks are common, some of them being terribly destructive. There are also many volcanoes (Fig. 471); in fact, the islands off eastern and southeastern Asia form the most active volcanic and earthquake region in the world.

Although northern and western Asia is a vast plain, so much of the continent is mountainous that more than one-twelfth of the surface has an elevation above 10,000 feet. Here are found the Himalayas (meaning abode of snow), whose loftiest peak, Mt. Everest (29,000 feet), is the highest in the world. Locate it. And here, too, are other ranges whose peaks rise above valleys themselves 11,000 feet above sea level, or higher than most mountains. Between the mountains are table-lands, like that of Tibet (Fig. 474), whose elevation is from 10,000 to 15,000 feet, or in places as high as the loftiest peaks of the Alps.

Much of central Asia is so arid (Fig. 475) that some of the rivers from the mountains end in the desert sands, which are often heaped by the wind into low hills or dunes. But from the margin of the great central highland large rivers flow north, south, and east to the sea. On an outline map of Asia draw heavy lines to show the chief mountain chains, and then add the larger rivers with their names. Fed by the rains, snows, and melting glaciers of the mountains, these streams have a great volume of water and bear immense quantities of sediment, which they spread out over their broad flood plains or build into deltas in the sea. In the east and south these fertile, river-made plains are valuable for agriculture, and are the seats of the densest populations in the whole world.

Many of the rivers are deep and navigable (Fig. 472); yet some of the largest lose much of their value for transportation because they flow northward over the cold plains of Siberia. This reminds us of the rivers of northern Canada, which also flow into the Arctic and are therefore frozen during a large part of the year.

In so vast a land, with such differences in elevation, there are, naturally, many different climates. Tropical heat is found in southern Asia, with dense forests in the belt of calms (Fig. 476), and in those places where ocean winds blow over the land; but where winds from the ocean cannot reach, there are broad deserts (Fig.

Fig. 471.
The volcano of Fujiyama in Japan.

Fig. 472.
The gorge of the Yangtse-kiang in China.

F

Fig. 474.

A farm-house in bleak Tibet, with a snow-capped mountain in the distance.

Fig. 475.

A group of Persian natives on the desert of eastern Asia.

475). Upon the mountain slopes (Fig. 474), and in the more northern latitudes, the climate is either temperate or frigid, as in North America and Europe.

For example, the climate about Peking resembles that of northeastern United States; and the plains of central Siberia resemble in climate the plains of Minnesota and Dakota, and produce the same crops. Such a climate, with warm summers and very cold winters, is called *continental;* and since Asia is the largest continent, the continental climate is best developed there. Thus where the Arctic Circle crosses the Lena River,

FIG. 476.

A tropical scene in a village in Ceylon.

the average temperature is 60° in July and 60° below zero in January, a range of 120° between summer and winter. This is the lowest winter temperature known in the world, and this point is therefore called the *cold pole* of the earth.

Plants and Animals. — The cold northern part of Siberia, like northern Europe and America, is tundra. Describe it (p. 296). Toward the south the tundra grades into the forest, low, stunted trees being followed by true forests of evergreens, birches, poplars, etc. Farther south, where the rainfall is light and the evaporation rapid because of the higher temperature, the soil is so dry in summer that the forests disappear. These steppes are covered with luxuriant

grass in the north, but farther south they grade into the desert. Since northern Asia is really a continuation of Europe, the wild plants and animals, as well as the farm products, resemble those of Europe. Name some of the European farm products.

Fig. 477.

The banyan, or Indian fig tree, from whose lower branches shoots descend and take root — common in Ceylon and other parts of southern Asia.

In southern Asia, on the other hand, from Arabia to China, the plants and animals resemble those of Africa rather than those of Europe and northern Asia. One reason for this is that southern Asia has a tropical climate like Africa; another is that a mountain and desert barrier separates northern from southern Asia. Trace this barrier on Figure 473. As in Africa the arid portion, including Arabia, Persia, and central Asia, is the home of the camel (Fig. 470) and ostrich (Fig. 510), while the elephant and rhinoceros (Fig. 470) live on the savannas and in the tropical jungles. Southern

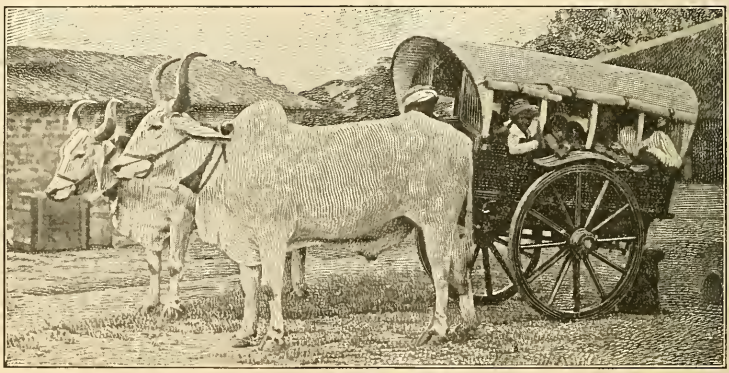


Fig. 478.

Native humped cattle used as draught-animals in Burma.

Asia is also the home of the fierce tiger and numerous species of monkeys and apes (Fig. 470).

The extent to which the Asiatic people have employed animals in their service is indicated by the following facts. On the frozen tundras, where none of the other large domesticated animals thrive, the reindeer (Fig. 330) not only supplies milk, meat, and hides, but is also used as a work animal. The camel, whose original home seems to have been Asia, makes human habitation possible in the desert (Figs. 470 and 488). Elephants are domesticated and made to work in the dense tropical forest (Figs. 479 and 496); and the buffalo is used as a work animal in hot, damp lands where horses find the climate trying (Fig. 478). Among the lofty plateaus and mountains, where the air is so rarefied and the slopes so steep that other work animals cannot be used, the yak is domesticated. Upon the steppes, where herds of cattle, sheep, and goats are kept, the horse is so necessary to the herder that the men almost live in the saddle. Indeed, the word *Cossack*, applied to Russians who dwell on the steppes, means horseman.

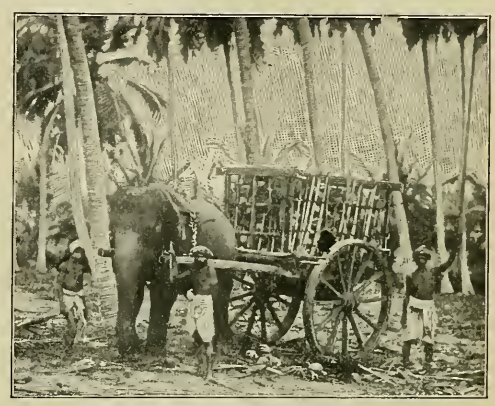


FIG. 479.
An elephant in Ceylon drawing a cart loaded with cocoanuts.

People. — Early progress toward civilization was made possible in Asia largely because certain portions were so favorably situated. The flood plains of the Euphrates and of the Indian and Chinese rivers had a fertile soil and an abundance of water for irrigation. They were, moreover, protected from invasion by ocean, desert, and mountain barriers, and the inhabitants could therefore cultivate the arts of peace. Among the shut-in valleys of the lofty mountains, also, were centres where development was possible because so protected from wandering hordes.

Asiatic peoples, moving into Europe, carried the civilization of their old home with them, and in time advanced much beyond those

whom they left behind. In fact, while Europeans have been progressing the Asiatics have been standing still, or even falling back.

It would be difficult to give all the reasons for this last fact, but there are three that are prominent. One is the very isolation which made the first development possible; for the people were so cut off and separated geographically that they failed to learn from others, as those Europeans who dwelt along the Mediterranean were able to do. A second reason is that many Asiatics, like, for example, the Chinese, have felt that their civilization was the best, and have therefore refused to learn. A third reason is found in the wonderful development of navigation by Europeans, who have thereby learned many useful lessons from all parts of the world, acquired wealth, and founded distant colonies. The sea, formerly a protection to many Asiatic people, has, in recent times, even been used as a highway of attack upon them.

FIG. 480.

Japanese rain coats.

Where European civilization has been adopted, as in Japan and parts of India, rapid progress has followed. This indicates the possibilities of these people.

More than half of the human race lives in Asia, two-thirds of them belonging to the yellow division (p 300; also Figs 467 and 468), while the remainder are mainly whites. But although there are more than eight hundred million human beings there, most of the continent is sparsely settled. The mountain slopes, the cold plateaus, the steppes, deserts, forests, and tundras support but few inhabitants (Fig. 466). In these places, hunting, fishing, and herding are the leading industries. Nearly seven-eighths of the people dwell near the coast, especially on the river flood plains and deltas of the south and east. There almost every foot of available land is cultivated, and soil is even transferred to boats on the rivers.

Turkish or Ottoman Empire. — While Constantinople, the capital of the Turkish Empire, is in Europe, Turkey has ten times as much land in Asia as in Europe.

Conditions in the Empire. — Turkey in Asia, although of little importance among nations at the present time, is of peculiar interest to us because of its historical associations. It is within its territory that many of the places mentioned in the Bible are located (Fig. 484); here also Christ was born, as well as the prophet Mohammed; and it was from this centre that much of the ancient civilization spread along the shores of the Mediterranean.

Fig. 481.

Spinning as done in Palestine and other parts of Turkey.

Much of Turkey in Asia is table-land, with short mountain ranges and extinct volcanoes, of which Mt. Ararat is an example. Excepting along the coast of the Mediterranean and Black seas, where the wind brings vapor, there is little rainfall. The streams are usually short and shallow, and there are numerous salt lakes. Point out the two principal rivers (Fig. 469).

Some of the mountain slopes are forested, but elsewhere the country is open, and in places suited to herding and agriculture. In the

valleys, wheat, grapes, olives, figs, oranges, and cotton are raised, usually by the aid of irrigation. SMYRNA is the most important seaport. Locate it. Find TREBIZOND.

The inhabitants, though so near Europe, have not advanced as Europeans have. The valuable minerals are scarcely worked at all; herding and farming are carried on in much the same way as in the time of Christ; and there is practically no manufacturing excepting that done by hand (Fig. 481). Some of this work, however, is very beautiful, as, for example, the Turkish rugs already mentioned (p. 459).

The unfortunate history of the region furnishes an explanation of its lack of development. Asia Minor, the peninsula between the Mediterranean and Black seas, was the pathway for the ancient caravan trade between Europe and Asia. While this brought prosperity, it also led to many invasions. More than five centuries before Christ the country was conquered by the Persians; two centuries later it came under the control of the Greeks; and later still it became a part of the Roman Empire. After that, with the decline of the Roman Empire, came invasions by wandering Turks, Tartars, and others. It was by this route that the Mohammedan Turks gained a foothold in southwestern Europe, and by their occupation devastated the country. Notwithstanding Mohammedan persecution, many of the inhabitants still profess the Christian religion, although at great cost, as is proved by the recent terrible massacres of the Armenians.

There are two parts of Turkey in Asia that merit special mention; namely, the *Holy Land*, and the valley of the Euphrates and Tigris rivers, or *Mesopotamia*.

The Holy Land (Fig. 484). — This part of Turkey in Asia possesses peculiar interest for us. Back of a straight coast, with no good harbors, lies a narrow coastal plain, beyond which are two low mountain ranges including between them the remarkable depression in which the Dead Sea is situated. While Hebron (Fig. 484) is about three thousand feet above sea level, the surface of the Dead Sea, a few miles to the east, is almost thirteen hundred feet below sea level, being the deepest depression on the lands of the world. Although fed by the river Jordan (Fig. 482), which flows out of a fresh-water lake, the Sea of Galilee (Fig. 483), the water of the Dead Sea is so dense from the salt it contains that a person cannot sink in it. The fact that it is salt shows that the climate is arid, for otherwise the depression

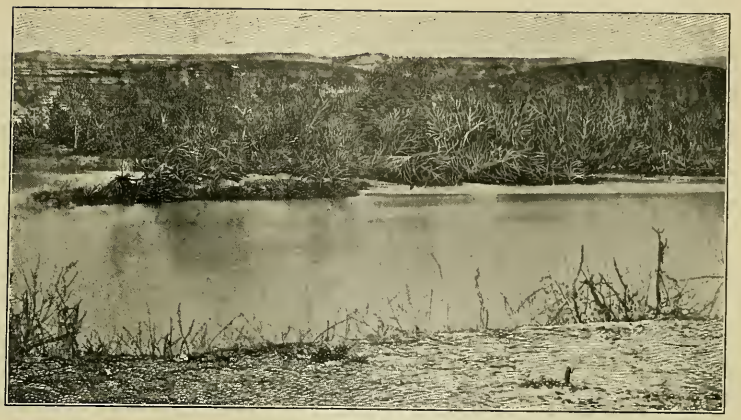


FIG. 482.
The river Jordan.

FIG. 483.
Tiberias on the Sea of Galilee.

HOLY LAND.
Scale of Miles.
0 5 10 15 20 25
Railroads
Highways
Dry River Bed
Part of Jordan Valley below Sea Level shown in purple.
34°30′
35°
35°30′
33°
32°30′
32°
31°30′
Kedesh
Waters of Merom
Achzib
UPPER
GALILEE
GAULANITIS
Bethsaida Julias
Ptolemais (Accho)
Chorazin
Capernaum
Magdala
Sea of Galilee
City of Gergesenes
To Damascus
Tiberias
Ilippos
R. Kishon
Mt. Carmel
Cana
Nazareth
LOWER
Mt. Tabor
Nain
Hieromax
Gadara
Gadarenes R.
Dor
Plain of
GALILEE
Esdraelon
Bethabata?
Arbela
Cæsarea
Scythopolis (Beth-Shean)
Pella
DECAPOLIS
Salim (Enon)
Dion?
SAMARIA
Samaria
Enon
Mt. Ebal
Shechem
Sychar
Jacob's Well
Gerasa
R. Jabbok
Jordan
Mt. Gerizim
Plain of Sharon
Antipatris
Joppa
Shiloh
Mt. Gilead
Ramoth Gilead
River
PEREA
Lydda
Mts. of Ephraim
Bethel
Rabbath Ammon (Philadelphia)
Jabneh (Jamnia)
Emmaus
Jericho
Rama
AMMONITIS
Azotus
JERUSALEM
Bethphage
Mt. of Olives
Bethany
Mt. Nebo
Askalon
Shephelah
Kidron
Bethlehem
JUDÆA
Judæa
Machærus
Hebron
Gaza
Plain of
Mts. of Judæa
DEAD SEA
R. Arnon
Wady Ghuzzeh
IDUMÆA
Beer-sheba
Wilderness of Judæa
MOABITIS
DAROMA
MEDITERRANEAN SEA
THE M. N. CO. BUFFALO, N.Y.
Longitude East 35° from Greenwich

FIG. 484.

would be filled with water, and, by overflowing, the sea would soon become freshened. The Jordan Valley lies no farther south than southern Alabama; yet since it is so low and enclosed, its climate is almost tropical.

Before the coming of the Jews this region was divided into small countries, often under the rule of their more advanced and powerful neighbors, the Egyptians. Then the Jews entered this "promised land" and created a kingdom which attained its greatest power under Solomon. It was here that many of the events in the Old Testament occurred, including the advance in religion from the belief in many gods to the acceptance of one all-powerful God. Persians, Egyptians, and Romans later ruled over Palestine, and it was during the control of the latter people that Christ was born at Bethlehem. What events in the life of Christ can you mention that occurred at some of the places marked on the map? (Fig. 484.)

FIG. 485.
A part of Bethlehem.

At that time, as we learn from the Bible, the region was highly developed. Wheat was raised upon the uplands, and olives, figs, and grapes in the valleys, while herds of sheep roamed over the plateaus and mountains. Recall events from the Bible that indicate these occupations. Palestine lay on the great caravan route which, leading from Egypt to the distant East, ran northward as far as DAMASCUS (Fig. 469) in order to avoid the Syrian desert. Throngs of people, therefore, passed this way. Jerusalem (Fig. 486), the capital, was a great city, situated upon a lofty elevation that made it an important stronghold.

The city is now visited by many Christians, and also by Mohammedan pilgrims who believe that Mohammed ascended to heaven from there. Very little of importance is to be seen, for much of the country, once

"flowing with milk and honey," is in ruins. Even the usual mode of travel is by mule or camel, as in olden times, although a short railway climbs the mountains from the seacoast, at JOPPA, to JERUSALEM, and another follows the old caravan route through NAZARETH, past the Sea of Galilee, to DAMASCUS. Trace these two lines. Recently a steamboat has been placed on the Dead Sea for the use of tourists.

FIG. 486.

A view in Jerusalem.

Mesopotamia. — This region, including the fertile valleys of the Tigris and Euphrates rivers, has suffered the same fate as the rest of Turkey in Asia. Formerly a country of great resources, crossed by a network of irrigation canals, "a garden of the Lord," it has been devastated by the Arabs and Turks until it is now almost a waste. Babylon and Nineveh, once the seats of a wonderful civilization, are now marked only by mounds of ruins. From these ruins records are at present being unearthed which promise to throw much light upon ancient history.

Under such conditions there can be little commerce, though the Tigris is navigable with steamboats as far up as BAGDAD. This city, situated on the caravan route to the east, was of much importance in ancient times. There is still some trade between Europe and India along this route.

Arabia. — This peninsula is a plateau several thousand feet in elevation, with a fringe of mountains (Fig. 487), most prominent in the south and west. What waters border Arabia? Since the coast line is wonderfully regular, there are few harbors and therefore few coastal cities. Nevertheless, the enclosed seas favored the early development of navigation here as in the Mediterranean. Therefore in very early times Arabian ships carried on commerce with Africa, India, and even with eastern Asia.

The climate is hot along the coast, but cool on the plateau and among the mountains. A great part of the interior is desert, and almost everywhere the rainfall is light. Why? (p. 265.) What about large rivers? Coffee is raised in the southwest, near Mocha; the date palm flourishes in many places; and fruits and vegetables are produced in many of the valleys.

FIG. 487.

A view among the Arabian mountains.

In so unfavorable a climate the population is necessarily sparse and largely nomadic. Cattle, sheep, goats, horses, donkeys, and dromedaries are raised in large numbers, the three last being celebrated for their excellent qualities.

Most of the Arabian peninsula is independent, though without a well-organized government. Turkey controls the west coast and the Persian Gulf coast as far as *Oman*. Oman, whose capital is the seaport of MASKAT, was formerly an important kingdom; it still has extensive pearl fisheries. The British have a foothold on the southwestern coast at ADEN, one of their most important coaling stations.

MECCA, a Turkish city about fifty miles from the sea, is sacred to all Mohammedans. It was here that Mohammed was born, and every Mohammedan is supposed to make a pilgrimage to it at least once during his lifetime. Most of these pilgrims come by sea, and every year the city, as well as the roads leading to it, are crowded with them.

Persia. — Like Arabia, Persia is an elevated table-land with large tracts of desert and salt steppes of little or no use to man. The arid climate prevents the formation of large rivers; but the rains and snows of the parallel mountain ranges permit some irrigation in the broad valleys. There is so little rainfall, however, and evaporation is so rapid during the hot, dry summer, that water for irrigation is often led from the mountains in underground tunnels. Why are tunnels preferable to ditches?

The main farm products are tobacco, wheat, barley, cotton, and opium. Much silk is also produced, and roses are cultivated for

FIG. 488.

A drove of camels in Persia.

the manufacture of attar of roses. The principal agricultural portion is near the Caspian Sea, where there is sufficient rainfall for crops and also for extensive forests on the mountain slopes. Among the mineral deposits is the precious stone turquoise; but although there are doubtless other valuable minerals there is little mining. Along the coast of both Arabia and Persia precious pearls and pearl shells are found.

Nearly two million Persians belong to nomadic tribes (Figs. 488 and 489) which roam about the desert, dwelling in tents, and herding goats, sheep, and other animals. There is no extensive manufacturing, but the Persians, like the Turks, do some very beautiful hand weaving, as, for example, shawls and rugs. Their carving and inlaid metal and wood work are also wonderfully artistic.

The government of Persia resembles that of Turkey and is therefore very bad. The ruler, or *Shah*, an absolute monarch, controls the lives and property of his subjects, who are mostly Mohammedans. TEHERAN, the capital, has some beautiful mosques, though the dwelling-houses are made of sun-dried bricks and face narrow, filthy streets.

FIG. 489.

A Persian nomad girl.

Afghanistan. — This country, "one of the waste places of the world," is a region of sand, bare rocks, and snow-capped mountains. Only in the valleys is the soil made to yield a harvest; and even there the cold, blustering winters and the dry, scorching summers make one of the worst of climates. Under such unfavorable conditions there has developed a people noted for hardiness, stubbornness, bravery, and cruelty.

As in other Asiatic countries so far studied, the government is very bad. The ruler, the merciless *Amir*, holds his authority by means of the terror which he inspires. His seat of government is at KABUL, nestled among lofty mountains. Since Great Britain has pushed her Indian frontier northward, while Russia has encroached on the opposite side of Afghanistan, this country is often called the "buffer state" between these two rival powers.

Russia in Asia. — This vast section of the Russian Empire includes about one-eighth of the land surface of the globe. There are several divisions, such as Turkestan and the dependencies of Bokhara and Khiva; but by far the largest is Siberia, which is a million square miles larger than Europe, and even larger than the

United States, Mexico, and Central America combined. Yet it has less than one-twelfth as many inhabitants as the United States alone. It is cold, bleak tundra in the north, and arid steppe in the south, while in the east are lofty plateaus and mountains. But in the central part is a broad belt of agricultural country, and much forest-covered land.

In the past Siberia has attained a reputation, mainly as a source of minerals, and as a place of exile for Russians whom the government wishes to dispose of for political or other reasons. Gold has been found in a number of places, as in the Urals and near Lake

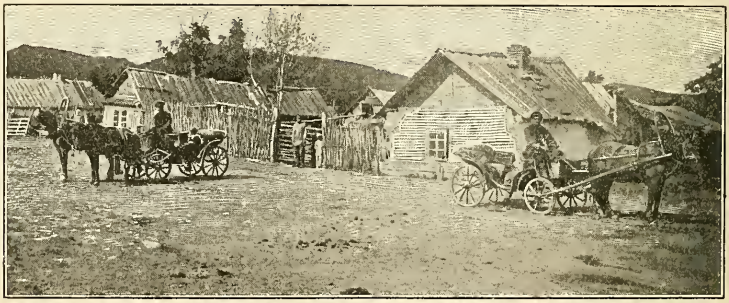


FIG. 490.

A village in Siberia.

Baikal, the largest fresh-water lake on the continent. But while there is much mineral wealth in Siberia, there has been little mining, excepting in the western part near Russia.

A new era seems about to open for this vast empire, for the Russian government is new constructing extensive railways which will open up the country for development. One system extends eastward from the Caspian Sea to Turkestan (Fig. 469), while another and longer one reaches from Russia in Europe to the Pacific Ocean. Trace it on Figure 469. Hitherto transportation across the vast plains, arid steppes, and rugged eastern mountains has been difficult in the extreme.

Heretofore the products of Siberia could not easily be exported; nor could machinery and other manufactured articles be brought in without the greatest difficulty. But by the building of railways we may expect a rapid development of Siberia, whose resources are far greater than the

sparseness of the population would indicate. Indeed, since the longer railway was begun there has been a rapid increase in population and exports, especially of corn.

There are some important cities in Russia in Asia. The largest in the southwest is TASHKEND, which is about the size of Indianapolis. TIFLIS, between the Black and Caspian seas, is really in Asia, though the Russian government classes this region with its European provinces. It is about the size of Tashkend. There are a number of other cities with a population of from fifty to a hundred thousand. In Siberia there are no large cities, though several along the railway, including IRKUTSK and VLADIVOSTOK, are now growing rapidly.

India. — This densely populated peninsula, with its warm climate, offers a striking contrast to cold, sparsely populated (Fig. 466), and slightly developed Siberia.

Physiography and Climate. — Lying largely in the torrid zone, the Indian peninsula has a hot climate. Its position in the trade-wind belt might lead us to expect much desert, especially on the lee or western side. But this coast really has a heavy rainfall because it is reached by the summer monsoons (Fig. 309). In the winter, however, when the winds blow from the land, the climate is so dry that plants wither; and in Baluchistan, which is not affected by the summer monsoons, there is true desert. Southern India and Ceylon, on the other hand, have a heavy rainfall at all seasons. Why?

FIG. 491.
Natives of the Cashmere Valley.

India, which is in the form of a triangle, has a remarkably regular coast and therefore few good harbors. Most of the peninsula is a plateau, rarely more than two thousand feet high and largely covered with lava flows like those of the Columbia River Valley of western United States.

North of the plateau is a broad lowland occupied by the Brahmaputra, Ganges, and Indus rivers, which, like the Po of Italy, have built the plains out of sediment brought from the mountains. Among the lofty mountains which lie to the north of the river plains, the highest are the Himalayas, in which there are scores of peaks; each reaching an altitude of over four miles. Even the mountain passes are from seventeen to nineteen thousand feet above sea level, or much higher than Mt. Blanc in the Alps.

Farming.— This mountain system has formed a northward barrier to British conquest, as in former days it served as a barrier to invasion from nomadic hordes which overran Asia Minor. With such protection the fertile plains and deltas of the three great rivers became the seat of early civilization. From the very earliest times the people have been engaged in farming, and at present fully three-fifths of the population follow that occupation.

Fig. 492.
A tea plant.

As there are 287,000,000 inhabitants in an area of about 1,559,000 square miles, it will be seen that there is an average of 184 persons for every square mile; and in parts of the country there are 500 per square mile. The density of population may be better understood by remembering that there are only twenty persons per square mile in the United States. There are, in fact, almost as many people in India as in North America, South America, and Africa together.

Millet, which grows on the dryer lands, and rice, which is raised on the river lowlands where the land can be flooded, are the staple foods of the natives. After the dense population is fed, however, little is left for export. Wheat, on the other hand, is raised for export, and India is a vast granary for Great Britain. Much cotton is

also produced. Some of this is manufactured into coarse fabrics for use at home and for export to China and Africa; but much is exported as raw cotton for use in the cotton mills of Great Britain. Other agricultural products are tea, sugar-cane, tobacco, opium obtained from a species of poppy, indigo of value as a dye, and jute grown upon the sandy river bars for the sake of its coarse, strong fibre.

FIG. 493.

A native village near Calcutta — notice the bamboo on the right.

For the production of rice, and for other crops as well, irrigation is necessary in many places. Therefore this country, favored with large rivers fed by the rains, snows, and melting glaciers of the mountains, has some of the most extensive irrigation works in the world.

Forests and Wild Animals. — There are valuable forests on the mountain slopes, where the trees, including pines, firs, and junipers, resemble those of Europe; and there are also magnolias and the beautiful deodar, a species of cedar. In the hotter portions are valuable medicinal plants and spices, such as pepper and cinnamon. The teak, whose strong, durable wood is of great value in building, and the mango, whose fruit is important as a food between harvests, are both common in many localities. Besides these, the bamboo and various palms are of great value. The bamboo is employed in hundreds of ways in making implements and building houses (Fig. 493); and the palms supply juices for drink, fibre for ropes and mats, and cocoanuts (Fig. 479) for food and oil.

In parts of the Ganges Valley and elsewhere there are *jungles*, or tracts of waste land densely covered with bamboos, canes, etc., and very difficult to penetrate. From these wastes the lion has almost disappeared; but the elephant is still found, and there are various species of the monkey; also the rhinoceros, buffalo, leopard, wild boar, wolf, and Bengal tiger (Figs. 324 and 470). The tiger is much dreaded, for it not only preys upon cattle, but even attacks men. Among the Himalayas, goats, sheep, asses, and dogs still exist in a wild state. Crocodiles live in the rivers; and venomous serpents are said to kill as many as twenty thousand persons each year.

Mining and Manufacturing. — In addition to the raw products of farms and forests there are valuable minerals, including salt, petroleum, coal, and iron. India has long been noted for hand-made goods of great beauty; but with the exception of these there is little manufacturing. Of late, however, there has been a marked development of cotton manufacturing by machinery.

Famines and Plagues. — Although these people are so extensively engaged in agriculture, there are times when they do not raise enough food for their own use, and then terrible famines result. These occur when rain fails; and it may be that one section suffers while another has an abundance. With the building of railways the danger of famines decreases, for then different sections are brought more closely together. The first railway was begun in 1854, and there is now a network across the peninsula (Fig. 469).

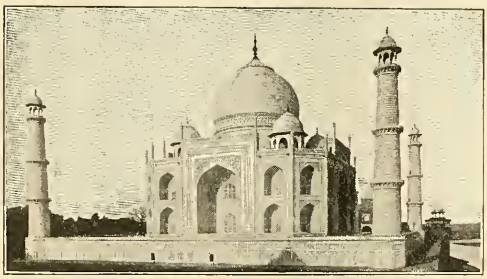


FIG. 494.
A tomb and mosque in India.

But even the railways do not entirely remove the danger; and probably famines will not cease so long as such vast numbers depend entirely upon the products of the soil. There is need that some of them adopt other forms of industry, as for example manufacturing, and thus secure the means of buying food from other less densely settled regions. An even greater need is the construction of still more extensive irrigation systems, for there is rainfall enough in some seasons if the water could be stored in reservoirs for use when wanted.

India has also been visited by plagues which have destroyed tens of thousands of lives. With a population so dense, in a climate so hot, disease spreads with rapidity and with terrible effect, particularly among people who are not properly nourished and whose surroundings are not always the cleanest.

The people have many religious superstitions. For example, the Ganges, doubtless because of its great value for irrigating and fertilizing the soil, is considered a sacred river (Fig. 498); and bathing in its waters is supposed to wash away disease, though, since the waters are also used for drinking, this custom is no doubt responsible for the spread of much disease. The conscientious Hindu makes at least one pilgrimage to the holy river as a means of gaining divine favor and forgiveness.

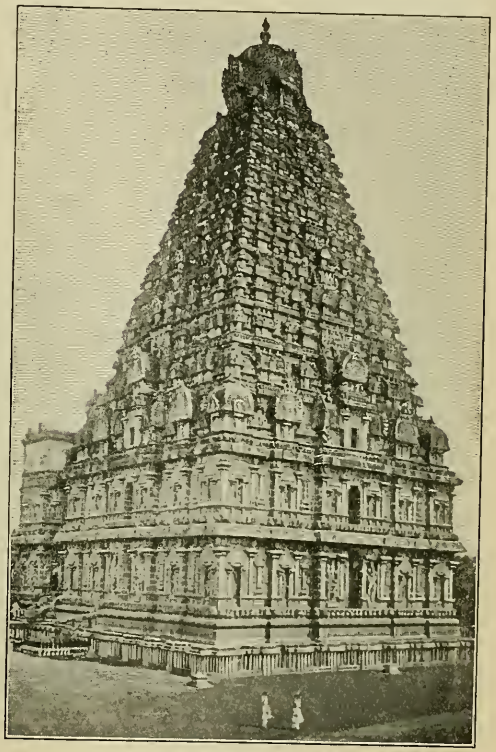


Fig. 495.
The Great Pagoda in India — a sacred temple.

Government. — Over three hundred years ago a company of London merchants obtained a foothold in India for trading purposes. The peninsula was then divided among many native rulers, and at various times the British government was called upon to settle disputes between them. Partly in this way, and partly through the necessity of intervening for the protection of British subjects engaged in the Indian trade, Great Britain gradually gained control of the peninsula. India was formally transferred to Great Britain in 1858, and in 1877 the Indian Empire was established as a part of the British Empire. The king of the British Isles is also styled Emperor of India.

By their protection and wise direction, the British are able to maintain their hold upon this vast country, whose population is more than seven times that of the British Isles. Throughout India there is an average of but one Britisher to every three thousand natives, and by far the greater number of government officers are Hindus. One of the members of the British ministry is Secretary of State for India; and, as in the case of Canada, a governor-general, called the *Viceroy,* is sent from Great Britain as chief executive officer. The British have not attempted to overturn the numerous native states; nor have they interfered seriously with the firmly established customs of the people. They have endeavored to guide and direct the people rather than to control them absolutely.

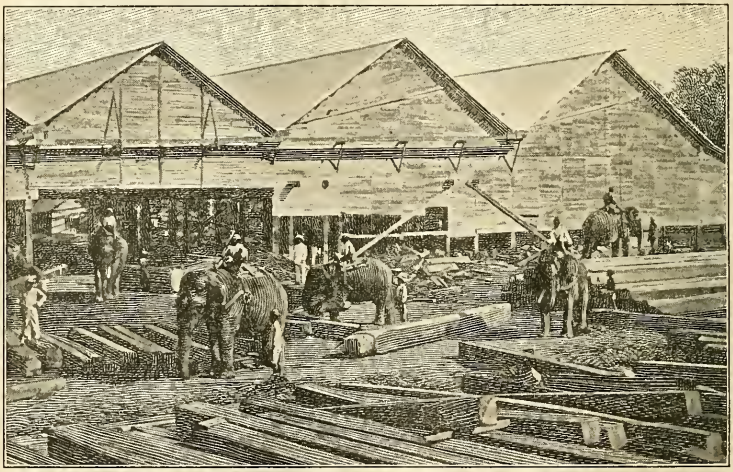


Fig. 496.

Elephants at work in a lumber yard in Burma.

Baluchistan and Burma. — The Indian Empire is not confined to the Indian peninsula. It includes also the desert country of Baluchistan to the west, and fertile Burma to the east. In the latter country there are great numbers of Mongolians. Vast quantities of rice are raised, and there are other valuable products, as rubies, sapphires, and tropical woods. In Burma the elephant is used for moving logs (Fig. 496), drawing ploughs, and carrying passengers. Rangoon, the seaport, is noted for its export of rice; but Mandalay, farther up the Irawadi River, is the largest city in Burma.

Base of Himalayas. — Between Burma and the peninsula of India, at the base of the Himalaya Mountains, is the region which has the heaviest rainfall in the world (p. 276). Much tea is raised on the hills of that section (Figs. 492 and 497); for tea requires a hot climate, an abundance of rain, and sufficient slope to prevent the water from standing about the roots of the plant.

The tea plant, which is three or four feet high, has bright green leaves resembling those of a rose bush. The leaves are picked several times a

Fig. 497.
Picking tea in India.

year, often by boys and girls. After they are picked they are dried in the sun and later in buildings, in order to remove all moisture before packing.

Just north of this tea district, among the Himalayas, are *Nepal* and *Bhutan*, which, though small, retain their independence because so protected by the mountains.

Principal Cities. — So many Hindus are engaged in farming that only about five per cent of them dwell in large towns. Nevertheless,

there are seventy-five cities with a population of over fifty thousand, while two, Calcutta and Bombay, have over eight hundred-thousand each.

Calcutta, the largest city, is a seaport on the Ganges delta and the natural outlet of the fertile Ganges Valley; but it has a poor harbor on a river whose volume is variable. It has some manufacturing, — being near coal fields, — but it is chiefly important as a commercial centre and as the residence of the Viceroy.

Fig. 498.

Temples along the Ganges at Benares.

Farther up the Ganges are the smaller cities, Lucknow and Benares. The latter, the "holy city of the Hindus," is on that part of the Ganges which is deemed most holy. At this point temples (Fig. 498) line the banks of the river for miles, and a steady stream of pilgrims pours in and out of the city.

While there are several cities on the Ganges, there are none on the Indus large enough to find a place on our map. This is not because the Indus is useless for irrigation, but because of shallow waters and sand bars which interfere with navigation. These are due to the fact that the river, though well supplied with water from the mountains, loses much of

it by evaporation in crossing the arid plains. Thus it is obliged to deposit some of its sediment as sand bars in its channel.

BOMBAY, next in size to Calcutta and the nearest port to England, is a great business centre. It is, moreover, the only Indian city with a really good harbor. MADRAS, the third largest city, is situated at a point where there is only an open roadstead protected by a breakwater.

Ceylon. — With a fertile soil, abundant rainfall, and high though equable temperature, Ceylon is a beautiful tropical garden, and was considered by the Arabs to be the Garden of Eden. Among the products of Ceylon are cocoanuts, rice, fruit, coffee, and tea. The island is the third most important tea-producing section in the world. Other products are sapphires and rubies from the stream gravels, and beautiful pearls and mother of pearl obtained from shellfish which live among the coral reefs.

Indo-China and the Malay Peninsula. — This peninsula consists of a series of mountain chains, spreading fan-shaped southward, with numerous long, narrow valleys between, which broaden toward the south and terminate in fertile, populous delta plains at the river mouths. In addition to Burma, a part of the Indian Empire, there are three divisions of this peninsula: (1) *Siam*, (2) *French Indo-China*, and (3) the *British Straits Settlements*.

Siam. — In this tropical country most of the inhabitants, who are either Chinese or Malays, live along the rivers and irrigation canals, where they are largely engaged in the production of rice. Millet, which is raised in the drier places, competes with rice in importance as a food. Among the mineral products are rubies, sapphires, gold, and tin. The forests yield tropical woods, especially teak wood, for use at home and for export.

Siam is a monarchy, the king being assisted by a council of ministers and a legislative body of noblemen. The poorer classes are still kept in a kind of serfdom by the local governors; that is, they may be compelled to labor for the governors for two or three months each year.

BANGKOK, the capital and largest city, is situated on the banks of a muddy river, up which vessels of small draught are able to pass to the city. Most of the inhabitants live either in poor houses on narrow ill-kept streets, or else in boats and floating houses on the river; but the king has

magnificent palaces decorated with carved marble and frescoed with gold. Buddhism is the religion of the country; and in Bangkok alone there are said to be ten thousand Buddhist priests whose temples (Fig. 499), decorated with gold, silver, and jewels, are wonderfully gorgeous. Next to the king the white elephant is held in highest reverence, and Siam is often called "the Land of the White Elephant."

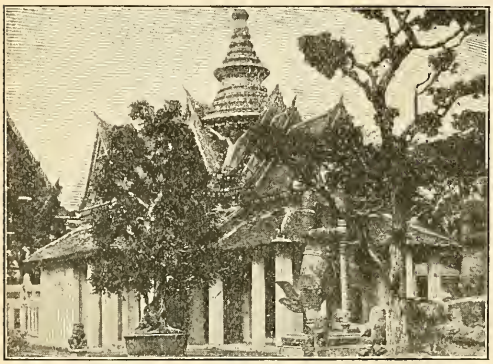


Fig. 499.
A Buddhist temple at Bangkok.

French Indo-China. — This dependency of France resembles Siam in climate and people. Its forest-covered hills yield valuable teak and iron wood, and in its valleys are extensive fields of rice and millet. Rice culture is here favored by the warm, damp climate and by the broad, easily flooded deltas and flood plains of the Mekong and other rivers. Silk, cotton, tea, and spices are other products, and there are also extensive coal beds. Some coal is exported.

Straits Settlements. — This is the name given to the British possessions on the southern end of the Malay peninsula. In that hot, damp country, so near the equator, such tropical products as rice, cocoanuts, gutta-percha, and spices are obtained. Extensive deposits of tin are found in this region, which supplies about half the tin used in the world. The mining is done crudely by Chinese, while the native Malays are mainly engaged in farming and fishing. The only city of importance is Singapore.

Chinese Empire. *Area and Population.* — This empire, which is nearly as large as Siberia, has more inhabitants than any other nation in the world. It includes nearly half the population of Asia; that is, about the same number as are found in North America, South America, Africa, Australia, the British Isles, and Germany together. Or, otherwise expressed, it has fully twenty-five million more people than live in all of Europe. The hordes of Chinese who live on the river flood plains and deltas of the south and east make this the most densely settled large area on the globe.

Nevertheless, there are outlying provinces of great extent, such as Mongolia, Turkestan, and Tibet, where the population is very sparse (Fig. 466). This is because of the rugged mountains (Fig. 474) and the vast desert plateaus where the dryness is unfavorable to all industries save herding. There are large sections, as in the great Desert of Gobi, where even this industry is impossible. Strangers find it difficult to enter some of these remote districts; and the holy city of Lassa in Tibet has been visited, it is said, by only three Europeans. The inhabitants wish to save their city and its sacred temples from intrusion, and they capture and often torture those whose curiosity leads them there. Over these wild regions the Chinese government is able to exert only a very slight authority.

Fig. 500.

A scene in the arid mountainous part of China, where camels are used.

Climate. — Most of the densely settled part of China has a temperate climate with an abundance of rain during the summer monsoon. In the north, for example near Peking, which is in about the same latitude as Philadelphia, the summers are warm and the winters cold; but farther south, as at Canton, just south of the Tropic of Cancer, the climate is tropical, and there is rain throughout the year. Toward the interior the climate grows steadily drier, and, with increasing elevation, colder also.

The rains and snows of the Chinese mountains supply water for a number of large rivers. The two most important are the Hoang-ho and the Yangtse-kiang (Fig. 472), whose floods spread out over the broad deltas and flood plains, thus depositing sediment and adding fertility to the soil. The greatest rise, which in the Yangtse-kiang reaches a height of fully forty feet, occurs during the summer rains.

It is with great difficulty that the Hoang-ho is controlled, and in the last twenty-five hundred years its lower course has changed eleven different times. In some cases this has caused a change of three hundred miles in the position of the river mouth. A single flood destroyed a mill-

ion people. Because of the repeated destruction of life and property, the Hoang-ho has been called "China's Sorrow."

People and Civilization. — The Chinese Empire is inhabited by people of varied origin, with different customs, religions, and languages. The Mongolians, who form the basis of the population, apparently came from western Asia, bringing with them the knowl-

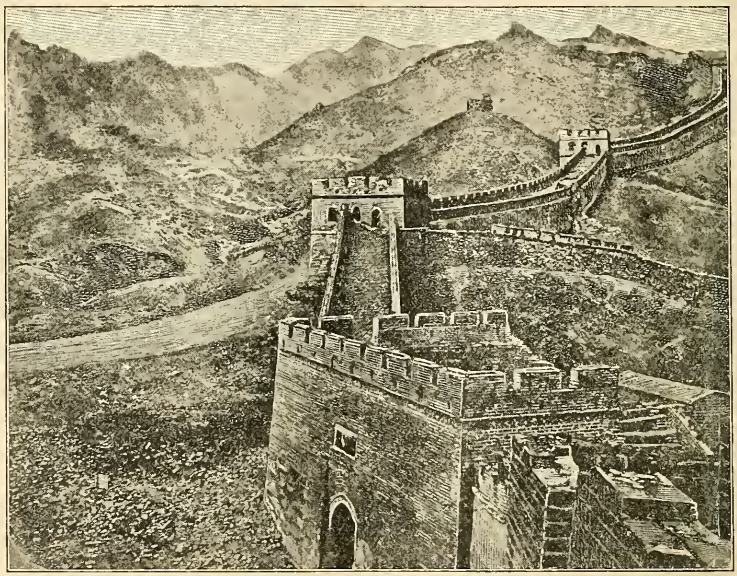


FIG. 501.

A part of the Great Wall of China.

edge of irrigation. Although China is partially protected on the west by mountain ranges and desert, the constant danger of invasion by nomads led, as early as 212 B.C., to the construction of the Great Wall (Fig. 501) along the northern frontier.

This wall, twelve hundred miles long in a straight line, and fifteen hundred miles with all of its windings, passes up and down hill (Fig. 501) and even over a mountain peak. It is twenty-five feet wide and thirty feet high, and at short distances apart are strong watch-towers rising still higher. This wonderful structure, which required armies of men to build, was so well made that it is still perfect in many places.

Long before Europeans had emerged from the state of barbarism, the Chinese had developed a remarkable civilization. The art of printing, the manufacture of gunpowder, the production of silk and silk goods, the baking of porcelain or china ware, and other importants arts were known to them long before Europeans learned them.

But in spite of their early start, the Chinese have been outstripped by Europeans (p. 470). Their peculiar customs in part account for

FIG. 502.
A scene in a public court at Shanghai.

their failure to advance farther. They are followers of Confucius, and his doctrine is everywhere taught. In fact, no one can be appointed a government official who has not passed an examination in the Chinese classics, including the doctrine of Confucius.

One of their doctrines is ancestor worship, which leads them to regard new customs as bad. This tends to check development, and is one of the reasons why they object to adopting European and American civilization. The strength of their ancestor worship is indicated by the fact that disobedience to parents is regarded in China as one of the worst of sins, for which children may be whipped to death. By law the punishment for striking a parent is death.

The conservatism of the Chinese is shown by their objection to the introduction of labor-saving machinery, and it is also shown by their methods of transportation. Much of the traffic is carried on by means of canals (Fig. 503), of which the largest is the Grand Canal (Fig. 469), built more than twelve hundred years ago. The rivers are also used (Fig. 472), even where transportation on them seems almost impossible; yet, instead of steam, they make use of poles, oars, and sails. Good roads are rare, and one of the principal vehicles is the wheelbarrow, even for carrying travellers. There are, for example, two thousand passenger wheelbarrows in SHANGHAI. Pack animals and men are used for carrying loads, and the more prosperous persons are carried in chairs by their servants. It is evident that a man's time in China is not valued very highly.

FIG. 503.

A typical Chinese village and canal.

National Resources. — Though many Chinese are engaged in fishing, both in the rivers and the ocean, they are in the main an agricultural people. Their farming methods are very crude; yet they are so careful and industrious, and labor is of so little value, that they till every bit of land possible. For example, water for irrigation, instead of being distributed only over moderate slopes, as in the United States, is often taken to the very tops of hills. It is first raised from the river by means of wheels, turned either by men or by buffaloes, and then pumped upward from one terrace to the next until the whole hillside has been watered.

The principal food of the Chinese is rice; but their main products for export are tea and silk. Tea is raised on the damp hill slopes of the south, where the conditions resemble those in India (p. 485). Fully forty thousand men and women are employed in carrying tea into FUCHAU alone. They receive but ten cents a day for their labor. In the warm south, great quantities of silk

are obtained, as in France, from the cocoon of the silk-worm caterpillar. Some of the caterpillars feed on forest leaves, others are carefully fed on the mulberry leaf.

As in other countries of southern Asia, the bamboo is one of the most valuable products. The seeds are ground up for food, and in spring the tender roots and stalks are eaten. The roofs and walls of houses, as well as nearly all articles of furniture, are made of bamboo wood. It is, moreover, woven into mats, baskets, and hats, while paper is made from its pulp. There is almost no other kind of manufacturing, nor is there much development of the wonderful mineral resources. It is said that China contains the largest coal fields in the world, in which both bituminous and anthracite coal occur; and there are also deposits of gold, silver, lead, and iron ore.

FIG. 504.
A Chinese pagoda or temple.

Government. — The Chinese government is peculiar. The *Emperor*, who has a right to nominate his own successor, is known as the "Son of Heaven." He has under him a *Viceroy* for each province, who must collect money for the imperial government, but is partly independent of the Emperor. The present Emperor is not a Chinaman, but belongs to the Manchu division of the yellow race, which invaded and conquered China in 1644. It was then that the Manchu custom of wearing a long queue, or "pigtail," was introduced into China.

Principal Cities. — There are many cities in China, all densely crowded. The poorer classes live huddled together, while the wealthier classes and officials dwell in comfort and luxury. The largest city is CANTON, which has more inhabitants than Chicago. It is situated on a densely populated delta and is a port of outlet for productive southern China, being especially noted for its silk. It is

said that three hundred thousand people, or one-eighth of the inhabitants, live in boats moored in the river.

HONGKONG (Fig. 505), an island which commands the approach to Canton, belongs to the British. To Hongkong many of the products of China are sent for export to Europe and America. It is therefore a very busy place. HANKAU and WUCHANG, on opposite sides of the Yangtse-kiang River, are important river ports for tea. As in the case of most Chinese cities, the number of inhabitants is uncertain. For example, by some estimates Hankau has a population of a million and a half, by others, only eight hundred thousand.

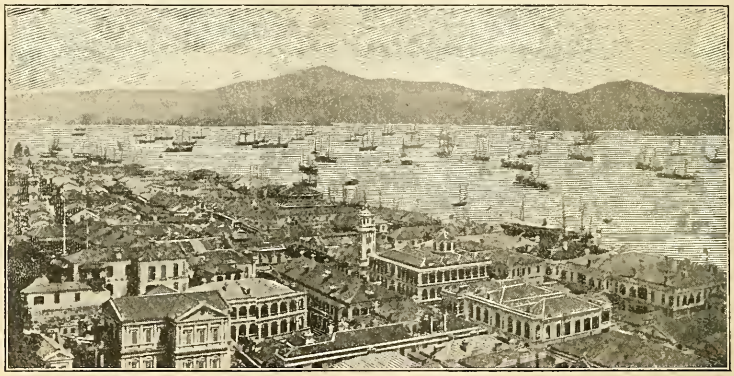


FIG. 505.
The harbor of Hongkong.

The treaty port[1] of SHANGHAI is another large city; but TIENTSIN, the port nearest PEKING, and the northern terminus of the Grand Canal, is still larger, having a population of about a million. It was from this point that the allied forces started, in 1900, to relieve the foreigners who were besieged in Peking by the Chinese Boxers.

PEKING, the capital of China, is situated on a broad, sandy plain. It has been the capital of a kingdom for three thousand years and of the Chinese Empire for over eight centuries. This city, like others in China, is surrounded by a high wall with gates that are closed at

[1] Foreigners are not allowed to trade in all Chinese cities, and those ports where this privilege is allowed by treaty are called "Treaty Ports."

night, as of old in Europe. It is a rectangular city, with one portion reserved for the gardens and palaces of the imperial government. This part is known as the "Forbidden City," because the Chinese government refused to permit foreigners to enter it.

Korea. — This mountainous peninsula has a temperate climate and is adapted to the production of such crops as grains in the north, and rice, tobacco, and cotton in the south. In many respects the inhabitants resemble the Chinese; in fact, Korea was a dependency of China until freed by the war between China and Japan in 1894. While there are great natural resources, including both coal and iron, there has been little advance. The government is an absolute monarchy; the people have few rights; and, until 1882, the country was closed to foreigners. But now foreign influence is beginning to be felt in this "Hermit Kingdom," whose capital is SEOUL.

Japan. — This island empire extends from Formosa, captured from the Chinese in 1894, to the Kurile Islands far to the north. How many degrees is that? About how many miles? The location of the islands with reference to the mainland reminds us of the British Isles; and, in fact, Japan's isolation from other countries has secured to her the same freedom from invasion as has long proved of such advantage to the British.

Physiography and Climate. — Notwithstanding the great length of the empire, its narrow islands occupy an area but little greater than that of California. So much of this is mountainous that not more than one-sixth of the surface can be cultivated, and many of the lowlands are difficult to reach because of the rugged surface and the absence of navigable rivers. There are numerous volcanoes (Fig. 471); and, since the mountains are still growing (p. 466), many earthquakes. These are so frequent and violent that in building their houses the people must allow for their force.

Nipon, the main island of Japan, has a warm temperate climate — due to the nearness of the Japanese current (Fig. 318) — and an abundance of rain. Other islands near by have a similar climate; but *Formosa* is partly within the tropics.

Under these conditions, in several respects so unfavorable, a dense population has developed, equal to more than half the number

in the United States. In many ways the Japanese are the most advanced people in Asia.

People and Government. — In early times Japan was invaded by Mongolians from the mainland, who expelled the original inhabitants to the more barren northern islands. From these Mongolians are descended the present Japanese (see Figs. 333 and 480), a people noted for their smallness of stature and their wonderful artistic instinct.

Fig. 506.
A Japanese peasant family travelling.

Centuries before the time of Christ they had developed a civilization resembling that of their kinsmen, the Chinese. Their fine taste led to the manufacture of many beautiful article of silk, metal, glass, and wood. Like the Chinese, they for a long time did not care for modern civilization, and closed their ports to the outside world. In 1853, however, United States warships under Commodore Perry entered Yokohama and induced the Japanese to open their ports to our commerce. After this important step the country, in 1868, was freely open to the world.

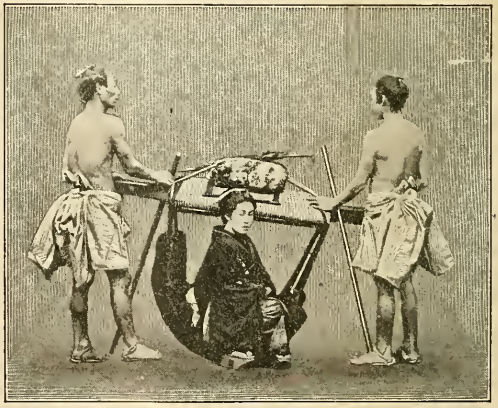


Fig. 507.
A Japanese travelling-chair.

One great drawback to the advance of Japan was the nature of the government, which resembled that of Europe in the Middle Ages. While the *Mikado* was nominally emperor, the real power was in the hands of noblemen who, by the feudal system, had large numbers of peasants, not only to work for them, but to fight

when necessary. After the country was opened to foreigners the power of the noblemen was lessened, and the Mikado became the real emperor. At present he is aided by two legislative bodies, one consisting mainly of noblemen, the other elected by qualified voters. There is also a Cabinet appointed by the Mikado, as the Cabinet of the United States is appointed by the President.

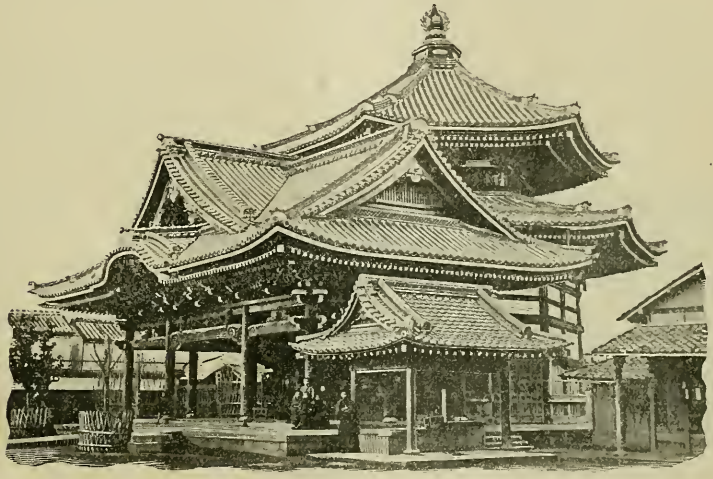


FIG. 508.

A temple in Japan.

Recent Advance. — Since these changes the Japanese have become noted for their willingness to learn the lessons of Western civilization, and their progress has been truly marvellous. New schools have been started, and education has been made compulsory. Americans and Europeans have been induced to go to Japan to teach, and Japanese students have been sent to Europe and America to study in the universities and to learn what they could of Western civilization. Thus, in a generation the Japanese have added to their own knowledge that of Europe and America; and they have learned their lessons so well that, with their patience, skill, and intelligence, they alone of all the nations in Asia have taken rank with the great nations of the world.

The progress that has been made is suggested by the following facts: over seven hundred newspapers and periodicals are now published in Japan. While in 1872 there was only one short railway from Yokohama to Tokio, a distance of eighteen miles, there are now more than three thousand miles of railway in the empire. There are many large manufactories of various kinds; and, as in the British Isles, cotton and other raw products are even imported for manufacture. There is a curious mixture of modern and ancient customs here (see Figs. 506–509).

Resources. — Among the mountains there are valuable deposits of gold, silver, copper, iron, and coal; and these are now well developed. The mountain sides are covered with forests of great value, including giant cedars, camphor laurels, and lacquer trees; and wherever the soil is favorable there is agriculture. Among the products of the farm are wheat, sugar-cane, and rice, the latter being the chief article of food, as among other Mongolians. As in China, both tea and silk are produced, and these form two of the main articles of export. Much of our tea comes from Japan. Besides these industries, fully two and a half millions of people are engaged in fishing.

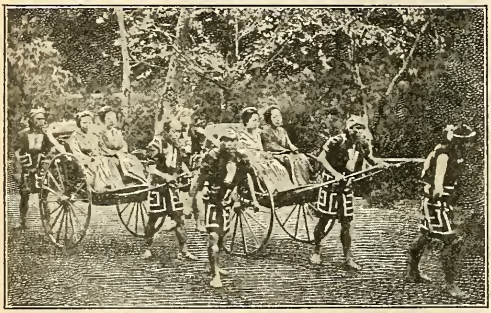


Fig. 509.
A jinrikisha, or "man-power-carriage."

Principal Cities. — Tokio, a city about the size of Philadelphia, is the capital of Japan. Besides being the home of the Mikado, and therefore having many government buildings, it has numerous manufactories. Yokohama, at the entrance to Tokio Bay, was a mere fishing village when visited by Perry; but since the harbor of Tokio is unsuited for the large modern ships, Yokohama has grown rapidly and now has the largest foreign trade in Japan.

Other important cities, having a population of several hundred thousand, are Osaka, noted for its cotton manufacturing; Kioto, the former capital, and the centre of the tea district; and Nagoya, a centre for porcelain

manufacturing, for which Japan has long been noted. All these cities are connected by railway lines, which have been a great aid in the development of their industries. State how.

Review Questions. — (1) Tell about the size of Asia; also its position with reference to the zones and other continents. (2) Tell about its physiography. (3) Describe the climate. (4) Tell about the plants and animals, showing the contrast between northern and southern Asia. (5) What about the use made of animals? (6) In what sections were the beginnings of civilization probably made? Why there? (7) Give reasons why Europeans have so outdistanced the Asiatics. (8) Tell about the population of Asia and its distribution. (9) Why is Turkey in Asia of special interest to us? (10) Describe its surface, climate, and industries. (11) Why, and from what peoples, has Asia Minor suffered frequent invasions? (12) Tell about the Holy Land: its surface; climate; history; present condition. (13) Tell about Mesopotamia. (14) Describe the surface and climate of Arabia. (15) Tell about its government, products, and principal cities. (16) Give the main facts about Persia. (17) Do the same for Afghanistan. (18) Compare the area of Siberia with that of various countries of the world. (19) What about the resources and future of Siberia? (20) Tell about India: its climate and surface; population; agricultural products; forests and jungles; animals and plants; minerals; manufactures; famines and plagues. (21) How did the British gain control over India, and how is the control exercised? (22) Tell about Baluchistan and Burma. (23) For what are the countries at the base of the Himalayas important? (24) Locate and tell about the principal cities of India. (25) What can you tell about Ceylon? (26) Give the principal facts about Siam. (27) Do the same for French Indo-China; for Straits Settlements. (28) Tell about China: area; number of inhabitants and their distribution; climate and rivers; people and their early civilization; reasons for their recent lack of development, giving examples; agricultural products; minerals and manufactures; government; principal cities. (29) What can you tell about Korea? (30) Tell about Japan: position; area; physiography and climate; population; people and government; recent advance; resources; chief cities.

Review and Comparison with North America.[1] — How do North America and Asia differ in form, coast line, islands, mountains, direction of rivers, and deserts? (2) What other differences between the two continents can you mention? What resemblances? (3) Is the Canadian Pacific railway north or south of the Siberian railway? Which is the longer? (4) Is San Francisco north or south of Peking? (5) Name the three peninsulas of southern Asia; of southern Europe. Which of the six is nearest the latitude of Florida? (6) Name the large rivers of Asia and of Canada that flow into the Arctic Ocean. On a globe estimate the shortest distance between the mouths of the Mackenzie and Lena rivers. (7) How do the great rivers of China compare in length with the Mississippi? With the Volga? (8) How do the interior lakes and seas of Asia compare in value for com-

[1] Aid in answering some of these questions may be obtained in Section beginning on p. 222 and the Appendix.

merce with our Great Lakes? (9) With what lake in North America may the Aral Sea be compared? (10) What ocean currents affect the climate of Asia? Of North America? (11) Compare the climatic belts of Siberia with those of Canada. (12) Is western Asia more or less suited to agriculture and commerce than western North America? Why? (13) In what portions of North America and Asia is rice cultivated? (14) Answer the same question for cotton. (15) What important crops in Asia are not extensively produced in the United States? (16) Name some of the leading imports from Asia to the United States. (17) What about mining in Asia compared with that in the United States? (18) Make the same comparison for manufacturing; for railways. (19) What is the prevailing kind of government in each of the two continents? (20) Compare the population of the five largest cities of Asia with the five largest in North America. (21) What are the advantages to the United States of its control of the Philippines? The disadvantages?

Suggestions. — (1) What do you know about recent massacres of Armenian Christians by the Turks? (2) Why, do you suppose, has Turkey not laid claim to all of Arabia? (3) Estimate the area of the Holy Land. (4) Make a sand or clay map of the Holy Land (Fig. 484). (5) Point out on the map (Fig. 484) some of the places often mentioned in the New Testament and describe some of the events that occurred there. (6) What Bible events have their scene in Mesopotamia? (7) Write a paper to show to what extent our present civilization is indebted to the Holy Land. (8) Find out some facts about the Crusades. (9) Find out the length of the railway across Siberia. (10) About how far is it by rail from Lisbon in Portugal to Port Arthur on the Pacific? (11) Read Kipling's Jungle Books. (12) Why should the Great Wall of China have less value now than formerly? (13) How is Peking poorly situated for the capital of so vast an empire? (14) Find out about our laws for the exclusion of the Chinese, and the reasons why they were passed. (15) Describe some of the events connected with the siege of the legations and the relief expeditions sent to Peking in 1900. (16) Find some facts about typhoons. (17) What Asiatic countries have you seen represented among the immigrants to the United States? (18) Examine pictures of buildings in Asia (in this book or elsewhere), to note how different are their styles of architecture from our own. (19) Write a paper telling in what respects you would expect to find an Asiatic city different from one of our own. (20) By what water routes could you go from New York to Tientsin? Would it be nearer to go by rail as far as either San Francisco or Seattle? (21) By what three all-water routes could you go from New York to Bombay? Which is the shortest? (22) Find some facts about Confucius, Mohammed, and Buddha. (23) Who was Omar Khayyám, and what did he write? (24) Find some facts about the conquest of parts of Asia by Alexander the Great. (25) Who first reached India by water? (26) Who was Marco Polo? (27) Find some facts about missionary work in Asiatic countries.

For References, see Teacher's Book.

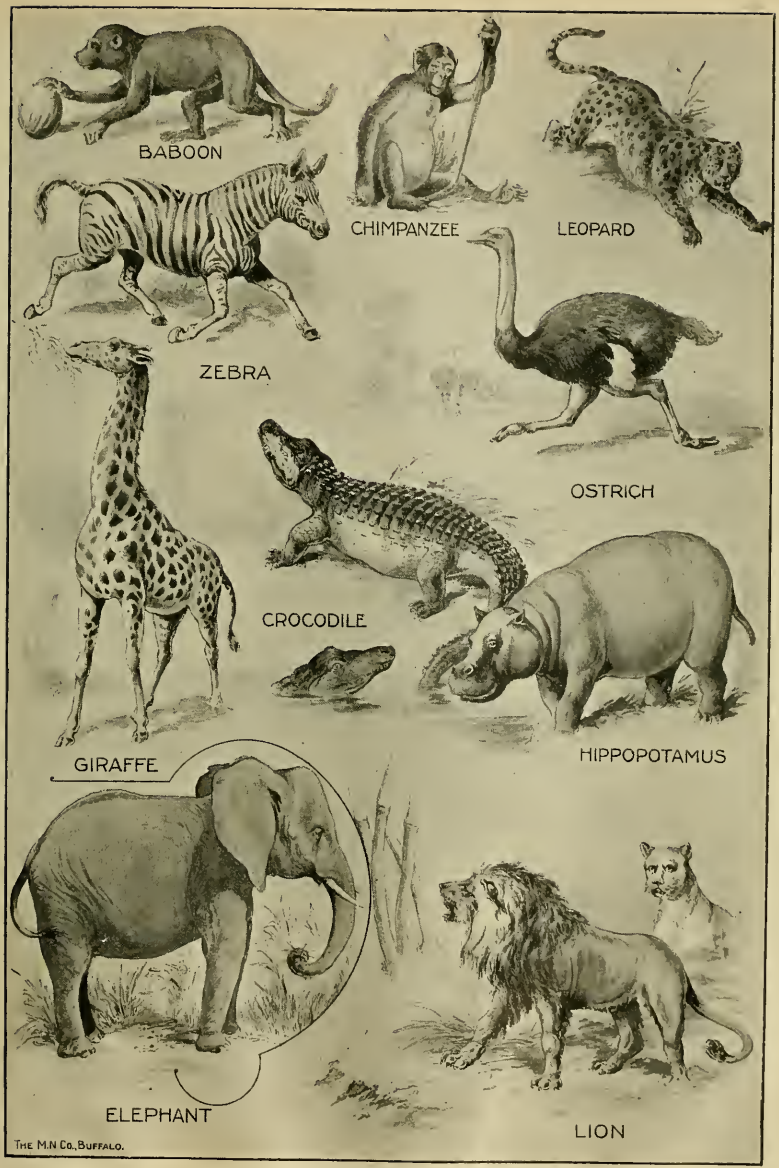


FIG. 510.

Some of the African animals.

FIG. 511.

MAP QUESTIONS. — (1) Compare the size of Africa with that of the other continents. (2) Sketch the eastern hemisphere to show the position of Africa. (3) Sketch the outline of Africa, and locate the principal rivers and lakes. (4) What peculiarity do you notice about the location of the mountains? (5) What zones cross Africa? (6) What kind of climate (temperature and rainfall) would you expect to find (*a*) in the extreme north;

(*b*) in the extreme south; (c) at the equator; (*d*) near the tropics? (7) Find the desert country north and south of the equator. Explain its cause. (8) How does it happpen that the Nile has water enough to flow so far through the desert? (9) In what sections are the most railways? What reasons can you suggest? (10) Where are the large cities? Compare their number with those in other continents. Why should there be this difference?

FIG. 512.

II. AFRICA

Physiography. — Africa, the second continent in size, resembles South America in outline. Its form is roughly that of a triangle, broad at the north and tapering toward the south. The coast line is remarkably regular, in striking contrast with the coast of Europe, Asia, and North America, and resembling that of South America and Australia. What must be some of the consequences of such regularity? What gulfs, seas, and large islands are found on the map of Africa?

Africa differs from all other continents in its mountain systems. It is mainly a plateau, but near the coast the plateau edges are broken and the rocks upturned, so that there is an almost complete mountain rim. Trace this rim (Fig. 512); from what part of the coast is it absent? In northern Africa the Atlas ranges reach an elevation of fourteen thousand feet; but the loftiest mountains are in the east central part. Among the latter is the volcanic cone of Kilimanjaro, the highest peak on the continent. Find this peak and trace the mountains from there northward. Notice the elevated land in Abyssinia.

Owing to the mountain rim the rivers of Africa are peculiar. For instance, the Niger, after rising among the highlands near the west coast, sweeps around in a great curve before entering the Atlantic. The Zambesi, in the south, also rises near the west coast, but crosses the continent eastward to the Indian Ocean. Trace the courses of the Nile and the Kongo, the two largest rivers.

In descending from the plateau each of these streams is interrupted by rapids and falls. Find the Victoria Falls of the Zambesi (Fig. 511); the cataracts of the Nile; also Leopoldville on the Kongo, below which are some falls. Rapids also occur in the Niger. How will these great rivers compare, therefore, with the Mississippi or Amazon as routes for commerce? How must these falls affect the development of Africa?

In one part of Africa there are several large lakes. Name the three largest. Into what rivers do they empty?

Climate. — The equator crosses so near the middle of Africa that only the northern and southern ends are in the temperate zones. Therefore the climate of most of the continent, like that of South America, is tropical. Since the altitude of so much of Africa is so nearly uniform, the belts of climate extend nearly east and west. What is true in this respect in South America?

In equatorial Africa, that is for some distance both to the north and south of the equator, there is such a hot, rainy climate that, as in the Amazon Valley, the land is densely covered with a tropical forest (Fig. 513). This is especially well illustrated at the base of the plateau where the narrow strip of coast land is hot, reeking with moisture, and the seat of deadly malaria. These conditions have greatly interfered with exploration, for disease is apt to seize white men even while they are crossing the coastal strip.

FIG. 513.

To show the influence of climate on vegetation. In the savanna area there are numerous forest-covered sections, especially near the rivers.

The interior, owing to its greater elevation, is somewhat cooler and less unhealthful; but even there tropical heat and rain prevail in the equatorial belt. It is this heavy rainfall that supplies the Kongo and Nile with their immense volumes of water. Both to the north and to the south of the rainy equatorial region is the savanna belt (Fig. 513) where the rainfall varies with the season. Why? (p. 268.) What are the conditions in the savanna? (p. 291.)

As the tropical forest grades into the savanna, so the savanna grades into the true desert (Fig. 513, also pp. 292 and 506), where the influence of the drying trade winds is felt at *all* times of the year. The northern desert is larger and better developed than that south of the equator. This is due partly to the fact that the continent is so broad in the north, and partly to the large land areas which lie to the north and east — the directions from which the winds of northern Africa must come. On the mountain slopes near the Mediterranean there is moderate rainfall; and likewise on the southeastern slopes of South Africa where the winds blow from the sea.

Plants and Animals. — Northern Africa is so close to southern Europe that there is a marked resemblance between the animals and plants on the two sides of the Mediterranean. The desert, however, serves as an effective barrier to their spread southward.

Portions of the desert, especially where covered with dunes of moving sand, are almost void of plant life. Animals are also few in number and limited in kind, among them being the ostrich (Fig. 510) and the camel. What have you previously learned about the plants and animals of the desert? (p. 293.) The oases, on the other hand, support a number of plants. Of these the date palm is most notable, for it is an important source of food for the nomads of the desert.

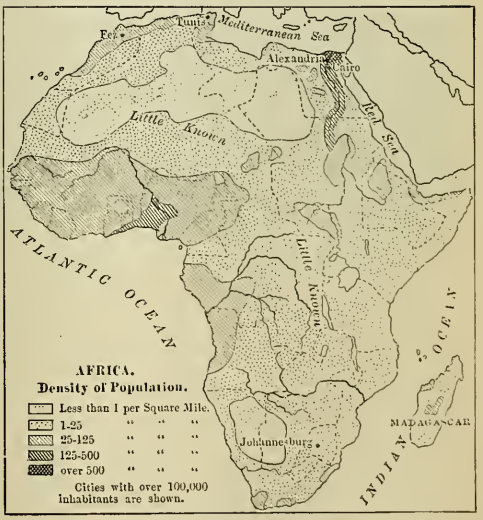


FIG. 514.

The open country between the desert and the tropical forest abounds in large animals (Fig. 510). Among these, on the savannas, and on the edge of the forest, are the antelope, giraffe, buffalo, zebra, elephant, lion, leopard, and rhinoceros, while the crocodile

and the huge hipopotamus live in the rivers. The dense forest itself is shunned by many of the larger forms, though teeming with insect life, birds, reptiles, and tree-dwelling mammals. Among the latter are the baboon, the gorilla, and the chimpanzee (Fig. 510).

The People. — Central and southern Africa is the home of the negroes, who are divided into many tribes with different customs. Some are fierce and warlike, others peaceful; those dwelling in the forest live by hunting; those upon the savannas, by primitive agriculture and by herding. For centuries they were captured by the whites and sold in slavery; but the day of the white slave-trade is now almost past. In spite of the former frequency of slave-hunting raids, and the great destruction of life in the fierce tribal wars, there are many negroes left. With a fertile soil, and in a warm climate, they are able to support themselves with a minimum of work, especially along the rivers and on the savannas.

Fig. 515.
An African negro woman planting.

While the forest and much of the savanna have been dominated by the negro even down to the present day, the arid sections of northern Africa have been held by the whites since very early times. Near the border line between the two races there has been such a mixture of blood that the population is largely of half-breeds.

Exploration and Settlement.— The Indies, famed for their precious stones, spices, and other valuable products, were reached by long journeys overland. But even before the famous voyage of Columbus, the Portuguese — the most progressive sailors of that day — were engaged in an attempt to reach these distant lands by sailing around the southern end of Africa. After various voyages, the Cape of Good Hope was finally passed and the way to the Indies by water was opened in 1498.

The Portuguese made settlements on the east and west coasts of Africa, and they still have extensive possessions there (Fig. 511). But progress toward development and settlement has been slow for various reasons, among which perhaps the most important is the fact that so much of Africa is tropical. The desert is forbidding, and the hot, damp climate of the coastal strip, upon which colonies were naturally first established, was found particularly unhealthful (p. 502). In addition, travel into the interior was prevented by hostile hordes of blacks, and by the absence of

FIG. 516.

A pyramid in the desert near Cairo — one of the remarkable works of the ancient Egyptians.

navigable rivers. Moreover, those who were willing to leave Europe were more attracted toward the continents of Australia and America. Why should they be?

By far the most successful settlement in the newly discovered parts of Africa was that made by the Dutch at Cape Colony, a little later than their settlement of New York. As in the case of New York the British seized their territory.

During the nineteenth century Livingston, Stanley, and others entered the "dark continent"; and since their efforts, exploration has been rapid. Many European nations have taken part in the exploration, and as a result have claimed territory. But the British have been by far the most active. What other nations have possessions there? (Fig. 511.)

Northern Africa

Political Divisions. — Much of northern Africa is such a desert that its inhabitants are few and scattered. It is, however, under the control of various nations. The greater part of the Sahara is claimed by the French, though the Spanish hold a small section on the western coast, and the British control both the Libyan desert and the Egyptian Sudan in the east. Along the Mediterranean coast are several well-settled sections, the best known being Egypt. The four countries west of Egypt — Tripoli, Tunis, Algeria, and

Fig. 517.
A nomad camp on the northern edge of the Sahara.

Morocco — are often called the *Barbary States* (the home of the Berbers).

The Sahara. — From the Atlantic to the Red Sea, and from near the Mediterranean to the grass lands of the Sudan, there is almost unbroken desert — the famous Sahara. Its area is estimated to be from three to four million square miles, or about equal to that of the entire United States. It is a plateau of uneven surface, with mountain ranges here and there, and bordered on the north by the Atlas Mountains. The wind-swept highlands are bare and stony, while the lowlands have extensive areas of sand dunes.

Much of the soil is fertile, and with rainfall would yield abundant crops. But nature has forbidden rain, and its surface is therefore barren in the extreme. Only on the oases, of which there are

some four hundred in the Sahara, is there the necessary drinking water which renders human life possible in the desert.

Caravans cross this desert, one of the important routes being from Tafilet in Morocco, southward to Timbuktu. There may be from a thousand to fifteen hundred camels in one caravan, and a full year may be required to equip it. Each camel is carefully selected by the chief of the caravan, and many extra camels are taken along to replace those that give out on the journey. There is one driver for every dozen camels.

Upon starting, the loads are carefully packed on the camels' backs, each animal bearing about three hundred pounds. A day's march lasts sixteen hours, the camels travelling some thirty abreast at the rate of about two miles an hour. Ordinary camels cannot travel more than three days without drinking; but the better grades are able to go for six or seven days without water and with almost no food. The trip across the Sahara, from north to south, requires fully three months. Estimate the distance. At best nearly a third of the animals perish in the round trip; and before the return journey is undertaken it is necessary for those surviving to have a rest of several weeks.

An advance party precedes the caravan to make arrangements for camping and for water. Many roundabout journeys are necessary to pass deep valleys and plateaus, for caravans go around rather than over obstacles. The daytime is hot; but as soon as the sun sets, the temperature rapidly falls and the nights become cold even in midsummer.

There are dangers in the journey aside from that of thirst. Sometimes sand storms arise; and although such a storm may not last a half-hour, it may destroy a whole caravan. The wind blows violently, and sand fills the air and drifts about in such quantities that animals and men alike are suffocated in the drifts. Also small caravans may be attacked by wandering tribes of warlike natives; and near the southern edge of the desert the danger from attack by the lion is added. It evidently requires courage and great powers of endurance to engage in the caravan trade.

Caravans which cross the desert carry the products of central Africa to the coast. These include ivory, skins, and ostrich feathers obtained by bartering with the negroes.

Egypt and the Neighboring British Territory. — Egypt proper and the Libyan desert are parts of the broad Sahara and have all the features of the desert just described. Even at Cairo the average yearly rainfall is but an inch and a half. In climate, both for

summer and winter, northern Egypt closely resembles the desert portion of western Arizona and southeastern California.

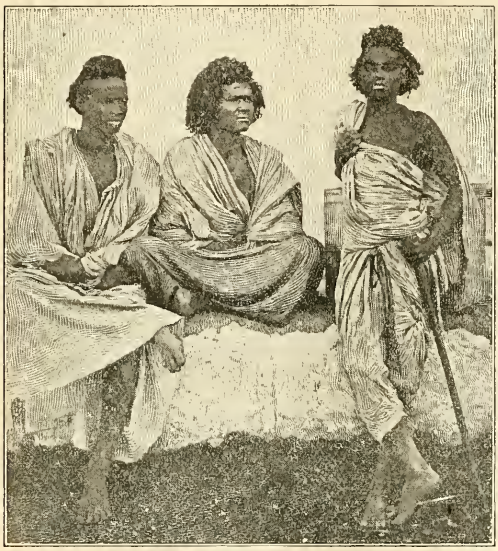


FIG. 518.
Sudanese people from the Egyptian Sudan.

The Nile. — The Egyptian Sudan and the country south of it, on the other hand, have a tropical climate, arid in the north, but warm and humid in the south, where the influence of the tropical rains is felt. The headwaters of the Nile, near the equator, are fed by such heavy rains that the river is able to flow across the desert in spite of the fact that no tributaries enter the lower half of its course. How great a distance is that?

Without the Nile the whole of northern Egypt would be a sparsely inhabited desert (Fig. 516); but the precious river waters transform the section near the Mediterranean (Fig. 519) to a great oasis which has become the seat of an important agricultural industry, and is densely populated.

After leaving the region of equatorial rains and the savannas, the Nile crosses the desert through a valley — in places a thousand feet in depth — which it has cut in the plateau. In this part of its course there are several cataracts (see Fig. 511). The Nile resembles the Colorado River of the United States, which, after leaving the Rocky Mountains, flows in a deep canyon across the arid plateau of Arizona; but the canyon of the Colorado is much deeper than that of the Nile. Below Cairo the river leaves its narrow valley, divides into several channels, and flows across a plain (Fig. 519). This plain is the *delta* which the Nile has built in the Mediterranean Sea during the ages that the river has been bringing sediment from its upper course. It is from the Nile that we have obtained the word delta, now applied to similar deposits at the mouths of rivers in various parts of

the world. The word comes from the Greek letter delta (Δ), which has the form of a triangle. Notice that shape in Figure 519.

Fig. 519.

The lower Nile. The shaded area between the two deserts is farming land which is reached by water from the river. The numerous crossed lines are railways. Find the Pyramids. Why is the location at the head of a fertile delta, and at the outlet of a narrow river valley bounded by desert, a favorable one for a large city?

When the rainy season comes to the Nile tributaries among the Abyssinian mountains, the river rises so high that it overflows large tracts of the broad delta below Cairo. The rise begins in June and reaches its height in October. By this overflow not only is the land

irrigated, but a thin layer of fine mud is spread over the fields. This serves so to fertilize the soil that, year after year, heavy crops may be raised without making the soil sterile.

Agriculture. — In consequence of these remarkably favorable conditions, the Nile delta has been occupied by an agricultural people from the very earliest times. It is still the seat of a great grain industry, producing wheat, corn, millet, and barley. Much rice and

Fig. 520.
The Sphinx and two of the Pyramids.

sugar-cane are also raised, and cotton which is of especial value because of its long fibre. There are many vineyards, and orange, lemon, and fig groves ; and both along the Nile and on the oases of the desert there are groves of date palms (Fig. 516). Grazing is of importance in the Nile Valley, and on the neighboring plateau. The animals raised include the buffalo and camel in addition to sheep, goats, cattle, horses, and donkeys.

The People. — The known history of Egypt reaches back several thousand years before the time of Christ. The fertile soil and favorable climate, added to the protection from frequent wars which the

surrounding desert and sea afforded, encouraged the development of industry and thrift. By the mixture of agricultural and pastoral races there arose a civilization in advance of that of the neighboring sections of Europe and Asia. In fact, at the time when Europe was inhabited by barbarians, and the peoples of western Asia were unorganized, Egypt had made long advances in civilization.

Fig. 521.
An obelisk in Egypt.

We read in the Bible of the Pharaohs who ruled over Egypt. Can you recall any of the Bible stories which relate to these rulers; for example, the story of Joseph? During those times the Egyptians built the obelisks (Fig. 521), the sphinx (Fig. 520), and those marvellous structures, the pyramids (Fig. 516), which are really the tombs of kings. By a peculiar process they preserved the bodies of their dead, and these *mummies* may be seen in the museums of many large cities. Among the mummies are the remains of the Pharaohs themselves.

Fig. 522.
An Egyptian sheik, a descendant of Mohammed.

In the movement westward of the people who dwelt along the eastern shores of the Mediterranean and farther east in Asia, Egypt became one of the highways of the world, and against its people many destructive wars were waged, and the country has been repeatedly invaded. As other nations have advanced, the Egyptians have steadily lost ground.

At present Egypt is required to pay annual tribute to Turkey, but she is otherwise practically independent of Turkey; and the ruler, or *Khedive*, is a hereditary monarch. The government of

Fig. 523.
A Fellah woman and child.

Egypt was so bad that the French and British finally stepped in and took control of the finances of the nation. When the French declined to aid in subduing a rebellion in Egypt, the British alone assumed a large share in the control of Egyptian affairs.

As a result of British direction there has recently been marked progress in Egypt. Extensive irrigation works have been undertaken, and the land area for cotton and sugar cane has thereby been greatly increased. By means of reservoirs and canals it is further proposed to reclaim thousands of square miles of the desert. Several railway lines have also been built (Fig. 519), including a part of the proposed line from Cairo to Cape Town. Outside of the Nile Valley, however, travel still depends largely upon the use of camels (Fig. 516).

Suez Canal. — Northeastern Egypt includes the Isthmus of Suez, which connects Africa with Asia. This narrow neck of land has for centuries stood as a barrier to water travel

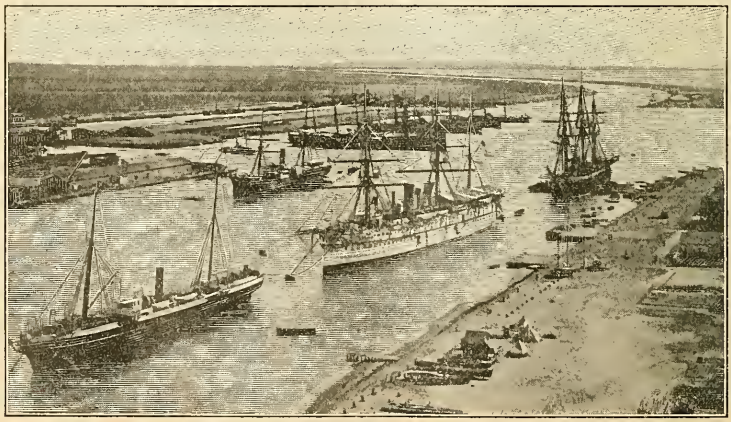


Fig. 524.
The Suez Canal at Port Said.

from Europe to southeastern Asia, compelling European vessels to pass all the way around Africa in order to reach southern Asia. Little wonder it is, therefore, that a ship canal has been built there.

Fig. 525.
An Arab school in the streets of Cairo.

The Suez Canal, begun in 1859, was completed in 1869. It extends from Suez to Port Said (Fig. 511), and is eighty-seven miles long, with a depth of twenty-six feet and a width at the surface varying from sixty-five to one hundred and twenty yards. Its length is much greater than that of the proposed Panama Canal, but the difficulties of construction were less. The country is very level, and, as in the case of the proposed Nicaraguan Canal, a part of the course (about twenty-one miles) is through a lake. Ten vessels on the average pass through the Suez Canal each day. Estimate the distance saved by this canal in going from London to Calcutta. By agreement among nations it cannot be captured and closed in time of war.

Cities. — At the head of the delta, just above the point where the Nile branches (Fig. 519), is Cairo, the capital and largest city of Egypt and, in fact, of all Africa. It is about the size of St. Louis, having a population of 570,000. This interesting place is visited each year by a stream of tourists, some seeking a winter health resort, others attracted by the strange life of the country and the remarkable ruins of the old civilization (Figs. 516, 521, and 521).

Cairo itself contains the palace of the Khedive, several interesting mosques, and a museum in which are preserved many Egyptian antiquities and works of art. The inhabitants also attract attention, for in the streets may be seen many people with different languages and peculiar customs. The differences among the people may be illustrated by the following fact: there are three Sabbaths each week, Friday, the Sabbath

of the Mohammedans, Saturday, observed by the Jews, and Sunday, by the Christians.

Alexandria, connected with Cairo by rail (Fig. 519) is the seaport of Egypt and the second city in size in the country. The chife business is the export of cotton, sugar, grain, and other Egyptian products, and the importation of manufactured goods. More than half the trade is with Great Britain.

Fig. 526.
The costume of women in Algeria.

The Barbary States. — Find the position of each of these four countries. Each borders the Mediterranean, but extends southward into the desert (p. 506.)

The Atlas Mountains skirt the Mediterranean coast from the Atlantic to Tunis, where their projection into the Mediterranean forms the most northerly point in Africa. These mountains contain many valuable mineral products, including precious metals in Morocco and Algeria, and marble and alabaster in the latter country. These mineral resources, however, have been but slightly developed.

Fig. 527.
A scene in Morocco, on the edge of the Sahara.

Since the Atlas Mountains cause vapor to be condensed when winds blow from the ocean or from the Mediterranean, many of the valleys are well watered. Forests cover some of the mountain slopes, and one of the valuable trees is the cork oak, the bark of which is removed for shipment from Algeria to Spain and Portugal. Camels,

sheep, goats, and cattle are raised among the mountains and upon the plateaus.

Agriculture is carried on here and there, often by means of irrigation, with water supplied by the mountain snows and rains, as in southern California. The villages are therefore situated where valleys open to the plains. Among the crops produced, besides dates and grains, are figs, grapes, and olives. Wine from the grapes of Algeria is shipped in large quantities to France; and the best olive oil and the best dates in the world come from Tunis.

FIG. 528.
Church of Notre Dame in Algiers.

The original occupants of this region, the *Berbers*, still dwell on the desert and among the mountains, having been driven there long ago by invading Arabs. Most of the inhabitants are Mohammedans. Tripoli is still a Turkish province, but Tunis and Algeria are held by France. However, the native ruler, or *Bey*, of Tunis is permitted to direct affairs in his country under the supervision of France. Morocco is the only one of the Barbary States that maintains independence, being ruled by an absolute monarch, or *Sultan*. Can you suggest why the conflicting interests of Spain, France, and England should prevent conquest by any one?

Conditions of life in Morocco are shown by the following: The writer once visited a school in Tangiers consisting of a dozen boys from nine to ten years of age. The room where they studied received its only light from the open door, and it contained no seats, desks, or furniture of any kind. The children sat on the floor in a semi-circle around a long-bearded old man, who likewise sat on the floor, and the only object they had before them was a page from the Koran, or Mohammedan Bible. What does

such a condition of education indicate in regard to progress? If this is the case on the coast, almost within the shadow of Europe, what must be the condition farther inland?

The capitals are the principal cities among the Barbary States. FEZ, one of the capitals of Morocco, is in the interior; but the Sultan and his court do not reside there all the year. Name the other capital. TANGIER, on the coast, is better known. Why should it be? In Algeria the seaport ALGIERS is the capital and largest

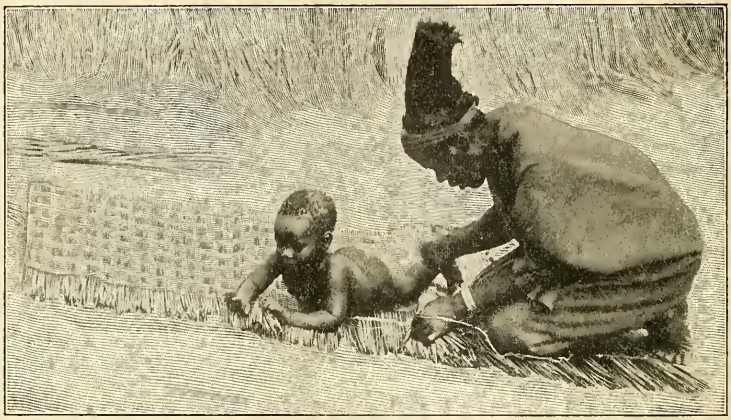


FIG. 529.
A Zulu woman making a straw mat.

city. It is an interesting place, combining many features of ancient and modern times. Under the French it has become an important trading centre. The same is true of TUNIS, the capital of the country by that name. Locate the capital of Tripoli.

SOUTHERN AFRICA

Comparison with Northern Africa. — In some important respects there is a resemblance between northern and southern Africa, although they lie in different hemispheres. What similarities are there in climate (p. 503) and physiography (p. 501)? There is a resemblance, too, in the fact that both sections have long been settled by white men. What difference is there in the length of occupation by white men?

The People. — It is to the Dutch that we owe the first important development of South Africa. Settling at Cape Town, and then spreading over the neighboring region, they took possession of the country occupied by the negroes and introduced the European industries of farming and ranching.

When Cape Colony came into possession of the British (p. 505), many of the Dutch remained; but others emigrated, or "treked," northward and found new homes in the interior. There they established two republics, the Transvaal and the Orange Free State, in which they desired to continue the customs of their forefathers and live in the pursuit of agriculture and herding.

Doubtless the *Boers*, as these people are called, would have been left to themselves but for the discovery of wonderfully rich deposits of gold. The mines were developed by British capital, and friction arose between the mine owners and the Boers. War followed, as a result of which the Transvaal and the Orange Free State were declared British colonies in 1900.

Fig. 530.
A pineapple field in South Africa.

At present, therefore, the British control a broad strip from the southern tip of Africa northward to the southern end of Lake Tanganyika. What are the names of the British colonies in South Africa (Fig. 511)? What nations control the land to the east and west of the British possessions? Besides the Boers there are many British in South Africa, especially in Cape Colony and at the gold mines of the Transvaal. There are also large numbers of negroes in this region, particularly in the tropical section and in Zululand in northern Natal (Fig. 529). Some of them, like the Zulus, have fiercely opposed the encroachment of the whites and still maintain semi-independent states. They are, however, making progress toward civilization.

Agriculture and Grazing. — Along the east coast, and in some of the interior valleys, agriculture is an important industry. Sugar, bananas, pineapples, tea (Fig. 530), coffee, and rice are raised near the coast, where the climate is warm and damp. But wheat, tobacco, vegetables, and grapes are produced in the cooler south, and upon the uplands wherever the rainfall is sufficient or irrigation possible.

By far the greater part of South Africa is an arid plateau, whose elevation causes cold winters in spite of the latitude. Forests are absent, and little wood is found excepting that which comes from

Fig. 531.
Cattle in the Transvaal.

the thorny acacia bushes of the plains and the willows and other trees that grow along the streams. Excepting in the real desert the grass springs into life after the summer rains (November and December), and the country becomes green and beautiful. Then follows a long drought, when the vegetation withers. But, as in the arid part of western United States, the dried grass is a sort of natural hay upon which cattle and sheep thrive.

Upon this plateau, therefore, immense numbers of cattle, sheep and goats are raised, and also many ostriches. It is estimated that in Cape Colony alone there are over eighteen million sheep and goats, one million cattle, and two hundred and fifty thousand ostriches.

In consequence, the production of wool, hides, meat, and ostrich feathers is of great importance. Of what value are these products to Great Britain?

Mineral Wealth. — The discovery of gold in South Africa has brought great changes, as among the mountains in the arid section of western United States. This metal is found scattered through a conglomerate rock in the Transvaal, near the city of JOHANNESBURG, which on that account has become the largest city of South Africa. This district has become the most important in gold production in

FIG. 532.

Cape Town with Table Mountain (3500 feet high) in the distance.

the world; in 1898 more gold was mined here than in the entire United States.

Other valuable minerals, including copper, iron, and coal, also occur; but as yet they have been little developed. At KIMBERLEY in Cape Colony, however, are diamond mines, which now supply ninety-eight per cent of all diamonds.

The diamonds occur as rounded crystals in a decomposed volcanic rock, and are obtained by digging out the soft rock and carefully removing the crystals. After this the crystals must be cut into the proper shape and polished. There are various grades, some clear and beautiful,

others impure and dull. So productive is this deposit of precious stones that $160,000,000 worth have been removed in eleven years. There is only a limited demand for diamonds; but the company in control is careful not to mine enough of them to reduce the price greatly. This is possible since the Kimberley mine owners have a practical monopoly of the diamond production of the world.

Commerce and Cities. — The two chief rivers of South Africa are of little use as trade routes. The Orange River is not navigable, because of lack of water and the presence of rapids at the edge of the plateau. The other, the Zambesi, is navigable by small boats for a

FIG. 533.

A scene at the market in Kimberley. Oxen are extensively used by the Boers as draught-animals.

distance of three hundred miles from its mouth; but the climate near the coast, especially on the delta, is warm and unhealthful. Rapid water checks further navigation, and at one point there is a cataract, the Victoria Falls (Fig. 511), which rivals even Niagara in grandeur. This cataract has a width of over a mile and a height of four hundred and fifty feet. It is therefore both wider and higher than Niagara; but the volume of water is less.

Nor is the coast especially favorable to commerce. For long distances there are no good harbors, while the river mouths are choked with sand bars which render entrance difficult. A breakwater has made Table Bay a good port, and around its shores, beautifully situated at the base of the Table Mountain (Fig. 532),

is CAPE TOWN, the capital and largest city of Cape Colony. It is connected with the interior by a railway line, the southern end of the proposed railway from Cape Town to Cairo.

A second important harbor is that of Delagoa Bay, upon which is situated LOURENÇO MARQUEZ, the capital of Portuguese East Africa. Being connected by rail with the interior, this port has been much used for the shipment of Transvaal products. DURBAN, the seaport of Natal, is a small city also connected with the Transvaal by rail. The two principal interior cities are KIMBERLEY and JOHANNESBURG (p. 519). There is no

FIG. 534.
A steamer on the Kongo.

important town in German South Africa, which is for the most part an arid plateau. To what nation does *Walfisch Bay* belong?

CENTRAL AFRICA

This vast area is in large part a great unknown. Much of it is tropical forest; but on the northern and southern sides are open savannas (p. 291).

The Rivers. — Owing to the heavy rainfall of the forest belt, the rivers are large. The Nile and Zambesi, already described, and the Niger and Kongo, all receive water from the equatorial rains. The Niger is navigable in sections; but there are rapids in some parts, and in its northern portion the river dwindles in size because of the dry climate.

It is the immense Kongo, which empties into the sea a few degrees south of the equator, that offers the best means of entrance to Central Africa. Although it is interrupted by a series of falls a short distance from the coast, above Stanley Pool there are thousands of miles of navigable waters in the main river and its tributaries.

It was Stanley who first explored the Kongo, in 1876; and since that time this part of Africa has been rapidly developing. Formerly it was necessary to carry goods around the rapids, each native porter carrying about sixty pounds. Only in this way was Stanley able to carry his boats to the navigable portion farther up stream. Now, however, a railway two hundred and fifty miles in length connects the lower Kongo with Leopoldville on Stanley Pool above the falls. From there, at all seasons of the year, steamers may go a thousand miles up the river and also into many tributaries.

The People. — Very few Europeans have settled in Central Africa, and the native blacks live almost as their ancestors did. Contact with civilization, however, has caused some changes, as the introduction of firearms and some slight improvements in the methods of farming. Most of the inhabitants live in ingeniously built huts clustered in villages (Fig. 535). They have a kind of tribal government, each tribe having a leader whose power is absolute, and under whom are minor chiefs. Some of the tribes are cannibals. In religion they vary greatly, though all are intensely superstitious (p. 301).

FIG. 535.
Huts in a negro village in Africa.

Among the blacks none are more remarkable than the *pygmies* whom Stanley discovered in the equatorial forests, where large numbers live in an area of about thirty thousand square miles. The adults are only three or four feet in height. They live exclusively by hunting, by gathering

the vegetable products of the forest, and by theft from the neighboring agricultural tribes. Their villages are usually built in the forest where two paths cross, and the huts are shaped like a turtle's back, being about four and a half feet high, ten feet long, and five or six feet wide. In that hot climate they find need for but little clothing.

With a small spear, a short bow with poisoned arrows, and a knife, they hunt with wonderful skill, and by means of pitfalls they capture even the elephant. They know the forest intimately, and neither bird nor beast can escape them. According to Stanley they offer one of the

FIG. 536.

A scene in tropical Africa, on the bank of the Kongo.

greatest obstacles to exploration; for they appear stealthily, attack a party with great courage, and then disappear in the trackless woods.

Divisions of Central Africa. — European nations have been active in claiming the greater part of Central Africa; but their control over the native inhabitants is merely nominal, and the boundaries of the different sections are not well defined.

The Sudan includes the vast area between the Sahara and the tropical forest. What can you tell about its climate? (p. 502). More than half of the Sudan is claimed by the French, and most of the remainder, including the *Niger Territories* and the *Egyptian*

Sudan, is held by the British. The inhabitants are nomadic in the north, and agricultural in the south, though they raise little more than is needed for their own use. There is some gold in the west; but the principal products are ivory, ostrich feathers, and gums.

East of the Sudan is *Abyssinia*, which is for the most part a rocky plateau crossed by mountains and difficult of access. Its condition is indicated by the fact that the capital is periodically changed when the supply of firewood is exhausted. It is evident, therefore, that there are no government buildings. The inhabitants are mainly whites belonging to very different tribes which are often hostile to one another. Many of the people still hold to Christianity, notwithstanding the invasion by Mohammedans nearly four centuries ago. Italy holds *Eritrea* and *Italian Somaliland*. What other nations occupy a part of the coast on the border of Abyssinia?

The map shows several small countries on the west coast of Africa in the part marked *Upper Guinea*. Find *Lower Guinea*. The divisions colored pink belong to the British; those marked green to the Germans. Find a section belonging to Spain.

One of the divisions of Upper Guinea is *Liberia*, which is of special interest to Americans. It is a negro republic established by Americans as a home for freed slaves, and its capital, MONROVIA, is named after President Monroe. No white man is permitted to become a citizen. Besides uncivilized negroes in the interior, the republic includes fully twenty thousand negroes with some knowledge of civilization, all living near the coast. The coastal strip is damp and unhealthful; but back of it is the forest-covered plateau slope. The products are chiefly coffee, palm oil, and sugar. It was the example set by the British in founding *Sierra Leone* as a home for liberated slaves, that led to the establishment of the republic of Liberia.

Kongo State, crossed by the equator and drained by the Kongo and its tributaries, was founded by the king of Belgium, who supported Stanley in his explorations of this region. It is in large part a forest-covered plateau; but there are sections of grass land. Hordes of savages, including the pygmies, inhabit the forests and savannas; the buffalo, elephant, and leopard live in the rivers; and the roar of the lion is frequently heard.

Through the building of the railway around the cataract of the Kongo, and by the aid of steamers above and below the falls, the resources of this great area are beginning to be drawn upon. From it are obtained large quantities of ivory, rubber, palm-oil, gum, and pepper, as well as tropical woods.

East of the Kongo State are British and German territories. What are they called? What is their climate? What products would you expect? Observe to what extent the British claim Africa. What break is there in the British territory between the Cape of Good Hope and the

FIG. 537.
A scene in tropical Africa.

Mediterranean? What variety of climate does the British territory include?

Need of Railways. — One of the great needs of Central Africa is railways for transportation to and from the sea. The three large lakes, Nyassa, Tanganyika, and Victoria Nyanza, are of great service in the transportation of goods, and already there are steamers upon them. Elsewhere caravans of native porters bear the products on their backs, travelling along narrow paths through the forest. The difficulties and expense of such transport are great.

With British and German energy we may expect that railways

will soon reach to the various parts of the interior of Africa; in fact, a railway to Victoria Nyanza is already well under way (Fig. 511). With such railways even tropical Africa, during the present century, promises to be opened up to development and settlement.

Islands near Africa

The large island of *Madagascar* which is larger than any of our States excepting Texas is two hundred and thirty miles from the mainland. There is much highland in the country, especially on the eastern side; but the coastal region is lowland. The island is controlled by the French, and produces cattle, hides, valuable tropical woods, rubber, and coffee. While there are some Arabs, and tribes of negro origin in the west, the natives are for the most part Malays, called *Hovas*, who came by water from the northeast.

Of the many small islands near the coast of Africa the northernmost are the *Madeira Islands* on the west side. These, together with the *Cape Verde Islands* farther southwest, have belonged to Portugal since the early Portuguese voyages of discovery. The Spanish *Canary Islands* lie between these two groups. Find other islands along the west coast (Fig. 511) which belong to Spain and Portugal.

Ascension Island and *St. Helena*, south of the equator, are, like the above-named groups, volcanic. They belong to Great Britain, and St. Helena attained notoriety as the prison home of Napoleon Bonaparte. The principal small islands on the eastern side of Africa are *Zanzibar* (British) near the coast, and *Reunion* (French) and *Mauritius* (British) east of Madagascar. Locate each of these (Fig. 511). Find other French and British islands. These islands are of value as naval stations. Their inhabitants are engaged in fishing and in agriculture, raising sugar cane and other tropical products.

Review Questions. — (1) What is the shape of Africa? (2) Compare the coast of Africa with that of other continents. (3) Tell about the highlands; the rivers and lakes. (4) Describe the belts of climate, and compare them with those of South America. (5) Tell about the plant and animal life. (6) Tell about the people. (7) Tell about the exploration and settlement. (8) What have been some of the principal obstacles to such explorations and settlements? (9) Name and locate the Barbary States. (10) What portions of northern Africa are under the control of European countries? (11) Describe the Sahara. (12) Describe the caravan trip. (13) Tell about Egypt: the climate; the Nile River; agriculture; people and government; Suez Canal; principal cities. (14) Describe

the Barbary States: their raw products; manufactures; commerce; inhabitants; government. (15) State resemblances between northern and southern Africa. (16) Tell about South Africa: the people; agriculture and grazing; mining. (17) What about the value of the Orange and Zambesi rivers for commerce? (18) Locate and tell about each of the cities: (*a*) Cape Town; (*b*) Lourenço Marquez; (*c*) Durban; (*d*) Kimberley; (*e*) Johannesburg. (19) Tell about Central Africa: the climate and rivers; the people and their customs. (20) Name and locate the principal divisions of Central Africa. (21) Tell about: (*a*) the Sudan; (*b*) Abyssinia; (*c*) Somaliland; (*d*) Liberia; (*e*) Sierra Leone; (*f*) Kongo State. (22) What about the need of railways? (23) Name the principal islands near Africa and give some facts in regard to them. (24) Make a sketch map to show the principal British possessions in Africa (Fig. 511). Add the possessions of other European countries.

REVIEW AND COMPARISON. — (1) Give several reasons why Africa has been explored and settled so much later than either North or South America. (2) What rivers of North America resemble those of Africa in having rapids and falls that interfere with commerce? (3) Contrast the Mississippi River with the Nile. Make a drawing of each, showing the principal tributaries and towns. (4) Compare the Kongo with the Missouri in length; with the Amazon (Appendix). (5) Compare the area of Lake Victoria Nyanza with that of Lake Superior (Appendix). (6) Is Africa on the whole as well adapted to agriculture as is South America? Give your reasons. (7) Make a sketch map of the Atlantic and compare the position of Africa with that of South America. What part of America is in the same latitude as the Sahara? (8) Cape Horn is how much farther south than Cape of Good Hope? (9) Why is not a large part of northern South America a desert, like northern Africa? (10) Compare southern Africa with southern South America in products and importance. Why the difference?

SUGGESTIONS. — (1) What per cent of the present population of the United States belongs to the negro race? (2) How do the negroes compare with the Indians in their willingness and ability to adopt civilized customs? (3) Read the Bible story of Joseph in Egypt. (4) Read the story of Moses. (5) Find out some facts about the Pyramids. (6) Why is England especially benefited by the Suez Canal? (7) What obstacles are in the way of building railways across the Sahara to take the place of caravans? (8) Read about our short war with Tripoli in 1804. (9) Why was the southern point of Africa called the Cape of Good Hope? (10) Examine a diamond to see how it has been cut. (11) Find out something about missionary work in Africa. (12) What reasons can you give for sending missionaries there? (13) Find out about the peculiar animal life upon the island of Madagascar. (14) Compare Madagascar with Cuba in regard to latitude, area, products, and people. (15) Find some facts about Livingston, Mungo Park, Stanley, and other African explorers. (16) Read one of the books of these explorers; you will find Du Chaillu's books on Africa very interesting. (17) Who were Bartholomew Diaz and Vasco Da Gama, and what part did they take in the discovery of the water route to India? (18) Find out about Krüger and the British war with the Boers in 1900.

III. AUSTRALIA AND ISLAND GROUPS

Australia

Physiography. — Australia lies apart from the rest of the world, an island continent in the water hemisphere and the only continent wholly in the southern hemisphere. Isolated for ages, its plants and animals differ (Fig. 538) from those in other parts of the earth. With its area of nearly three million square miles, it approaches the United States or Europe in size. But it has been settled by Europeans so recently, and so much of its surface is desert (Fig. 539), that it is much less densely populated than the other continents. Much of the interior is practically unexplored, partly because of the desert and partly because of the absence of interior navigable waters.

The surface, like that of Ireland, suggests a plate in form, since the low interior rises gradually to plateaus and mountains which often descend steeply toward the sea. While there are some low, short ranges in the interior, the highest land is in the east, where the mountains run parallel to the coast. In the southeast some of the peaks reach a height of over a mile.

The mountains of eastern Australia, like the Appalachians of North America, are the worn-down remains of an ancient mountain system. Still further like the Appalachians, they served to check the extension of early settlements inland. Tasmania is really a continuation of the eastern highland, as Newfoundland is a continuation of the mountains of eastern North America.

The streams which flow eastward to the Pacific, cascade down the mountains in short courses. Of the others in eastern Australia some end in the lakes of interior basins, and some evaporate in the dry climate; but many unite with the Darling and Murray rivers, which are at times navigable for long distances. During the dry

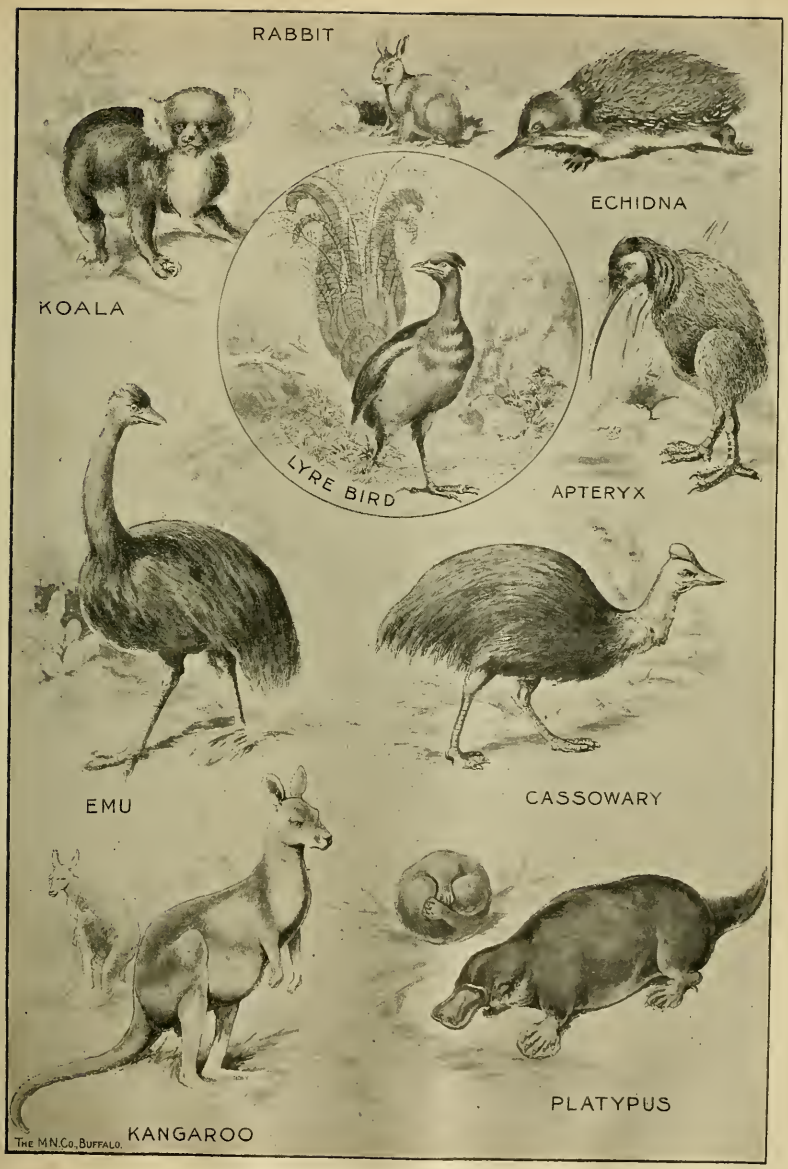


FIG. 538.

Some Australian animals. The platypus lays eggs like a bird or reptile. The kangaroo, like other marsupials, carries its unprotected young in a pouch. Where else have we found large running birds like the emu?

FIG. 539.

MAP QUESTIONS. — (1) Judging from the railways and cities, which is the best-settled part of Australia? (2) Which part is least settled? (3) What reasons can you suggest for these facts? (4) From the lakes and rivers what do you infer concerning the climate of the interior? (5) How does Tasmania compare in area with Pennsylvania? (Appendix).

With your own state? (6) Make the same comparison for New Zealand. (7) Make a list of the island groups belonging to the United States; to Great Britain; Germany; the Netherlands; France. (8) What nations claim parts of Borneo? New Guinea? (9) Find the area of each of these islands (Appendix) and compare it with the area of your own state.

RELIEF MAP
OF
AUSTRALIA
Modeled by
EDWIN E. HOWELL
SCALE
TASMANIA
NEW
ZEALAND
New Caledonia
Fiji Islands
PACIFIC
OCEAN

FIG. 540.

summer season, however, all excepting the Murray may dwindle to mere chains of water holes. A wave-built bar at the mouth of the Murray closes it to ocean steamers, so that, unlike the Mississippi, no large cities have grown up along its banks.

The coast line of Australia is so regular that for long distances there are no good harbors; but the sinking of the land in the southeastern part has caused some excellent ports.

Off the northeastern coast is the *Great Barrier Reef*, the longest coral reef in the world. This has been built by coral animals, which still thrive there in great numbers. A few openings allow ships to enter the quiet channel between the reef and the land; but navigation is not easy, and only an experienced pilot can avoid the dangerous shoals. Small sailboats carrying divers and their assistants, usually Malays, are engaged on this reef and the northern shores of Australia in fishing for pearls, pearl shell, and other products of tropical waters.

Climate. — Since Australia lies within the belt of the southeast trade winds, the eastern highland has an abundant rainfall on its seaward side and is clothed with dense forests. After crossing the mountains, however, the winds are so dry that the forest gradually disappears, changing first to open, park-like woodlands, then to grass-covered uplands, and finally to desert lowlands, still partly unexplored. The low interior mountain ranges cause only a slight rainfall which supplies the salt lakes of the interior.

FIG. 541.
Eucalyptus forest in Australia.

During the southern winter the interior becomes cold, and the heavy air presses outward toward the coast as cold land

winds; but during the summer the dry interior is so intensely heated that monsoon winds blow from the northeast and bring equatorial rain to the northern coasts. In this section are found areas of tropical forest. Southwestern Australia and Tasmania are reached by the prevailing westerlies, with their cyclonic storms, which bring variable weather and rainfall, as in eastern United States. These rainy sections are also clothed with forests.

Fig. 542.
Undergrowth in the Australian forest.

It is therefore only along portions of the coast that there is enough rainfall for agriculture, while the interior, and much the greater part of the continent, is either arid or actual desert. Much of the interior is adapted to ranching, though some parts are even too arid for that; but the southeastern coast, whose equable climate reminds us of the Mediterranean, will support a dense population.

Plants. — Australian vegetation is not only peculiar, but also strikingly adapted to the climate of the country. In the interior, as in other desert regions, grass and flowering plants have gained the power to make rapid growth and to mature their seeds quickly, so that a few days after a rain the barren sands become carpeted with green as if by magic.

Among the desert grasses, one of the most remarkable is the porcupine grass which grows on the sandy plains of the northwest interior, and is so hard, wiry, and spiny as to prevent passage through it. Plants with leaves which taste of salt also thrive here, being fitted for growth on plains that are too dry and alkaline for grass. These "salt bushes" are so valuable as forage for sheep and cattle that they are now introduced into the arid section of southwestern United States.

The scrub trees that flourish in the arid interior have developed a foliage able to resist evaporation. For example, the gum trees (Eucalyptus) hold their narrow leaf blades vertically with only the edges toward the sun's rays; the leaves of wattles (Acacia) and other plants have shrunk to thorns; and some trees secrete odorous oils which check

evaporation. The leaves are too tough and leathery to wilt, and their dull greens give a sombre tone to the scattered woods. In these interior forests, which the settlers call "scrub," the thorny acacia and the close-set stems of the gum — rising to a height of a dozen feet — form a thicket through which a lost traveller may wander until death relieves his thirst.

On the equable rainy slopes near the coast some of the gum trees are giants, in some cases four hundred feet in height. They rival the "Big Trees" of California, which also thrive where damp winds blow from the ocean. The undergrowth of the forest (Fig. 542), which is almost tropical in character, includes tree ferns, palms, and orchids. These dense woods are called the "bush."

History. — When discovered, Australia was sparsely settled by blacks allied to the negroes of Africa, but differing from them in many respects. Of these savages it is estimated that about seventy thousand remain, of whom about a third still wander in the wild interior, scantily clad (Fig. 543), building the rudest of shelters, and gaining their living by hunting. They still use that peculiar weapon, the *boomerang*, which, when properly thrown, will fly in curves and even return to the thrower.

Fig. 543.

An Australian savage. (See also Fig. 332.) The boy has a boomerang in his hand.

Although for a long time it had been known that there was an Australian continent, settlements were not made there until 1778. Neither the country nor the products were tempting to the early Spanish and Dutch explorers, and those nations colonized other lands of greater promise. It was not until the famous English navigator, Captain Cook, led an expedition to this southern continent that the fertile southeastern coast was discovered.

For a while the distant land was used as a regular penal station to relieve the crowded condition of English jails, and naturally free settlers came to the country slowly. But their number gradually

increased, and, after long agitation, the transportation of criminals was stopped.

Almost at the same time that gold was discovered in California it was also found in southeastern Australia, and tens of thousands of people rushed there to wash the sands for the precious metal. Since the miners needed supplies, many of the settlers turned their attention to other industries, especially agriculture and grazing. Therefore in Australia, as in California, the gold mines led quickly to the development of the country's resources.

FIG. 544.
Density of population in Australia and neighboring islands.

New South Wales, as the first colony was called, finally grew so large, and the settlements were so scattered, that it became difficult to control it under a single government. Consequently Tasmania, Victoria, and Queensland were successively set off as separate colonies. South Australia and West Australia, however, were settled as distinct colonies.

The colonies prospered under their popular government, each with its own laws, some having free trade, some imposing tariffs on goods imported from other colonies. Common interests, however, early awakened a desire for union; and finally, on January 1, 1901, they were united to form the *Commonwealth of Australia*. This new commonwealth has a government similar to that of Canada, and is independent of England in all matters excepting those which affect the British Empire as a whole. The population, which equals that of the United States when her Constitution was adopted, is rapidly growing.

Nearly all the Australian settlers have come from the British Isles, and the unity of the race has led to a peaceful growth. As in England,

education has been encouraged, church schools now being replaced by practically free, compulsory education in public schools. There are colleges at the capitals, and two important universities. The English love of outdoor sports is fully maintained, and great skill is naturally developed in a climate where it is possible to practise cricket, football, tennis, and rowing all the year round.

Sheep Raising. — Although it was gold that brought population to Australia, her greatest wealth lies in her flocks of Merino sheep. Australian wool is the finest in the world. Sheep were first known in Asia, where doubtless they were originally wild animals; and the ancestors of the Merino were such as those tended by Jacob. From Asia the breed spread along the Mediterranean and found in Spain a favorable, dry climate. From this point flocks were taken to the early Dutch colony of South Africa and thence to Australia. The Merino sheep had for centuries been carefully tended in Europe and separated from coarse-wooled varieties; and when it was found that the climate and natural herbage of Australia really improved the quality of their wool, the English demand for that product led to a rapid development of the sheep-raising industry. It has now spread to the newly discovered pastures west of the mountains.

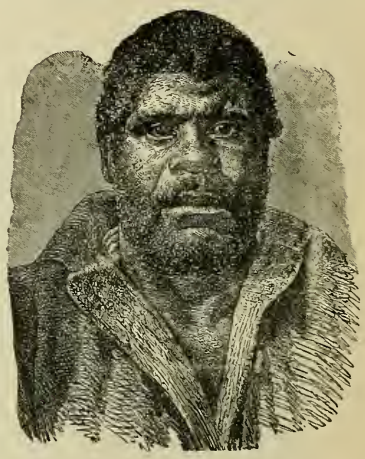


Fig. 545.
The last Tasmanian, a race now entirely extinct.

In the early days of Australia the flocks were reared upon the unfenced government land, as in western United States (p. 165). The sheep were driven to pasture and water, and cared for at night by lonely shepherds, much as in the days of David. But now the land is largely fenced with wire, each sheep station having its own "*run*," or ranch. The largest ranches contain fully a hundred thousand sheep, and employ men enough to make a little village, with a store, a church, and a school. As in Argentina, each run is divided into sections, or "*paddocks*," by wire fencing, so that the sheep of different ages and conditions may be separated.

The mildness of the climate makes it unnecessary to provide winter protection for the animals, and now that the wild dogs have been exterminated, the sheep no longer need much care from shepherds.

Animal Products. — To-day grazing is the characteristic and most important occupation in Australia. There are over a hundred million sheep, and fully half the exports consist of wool ; but frozen or canned mutton and beef, together with tallow and hides, are also sent to England. Horses are bred for export, and cattle and swine

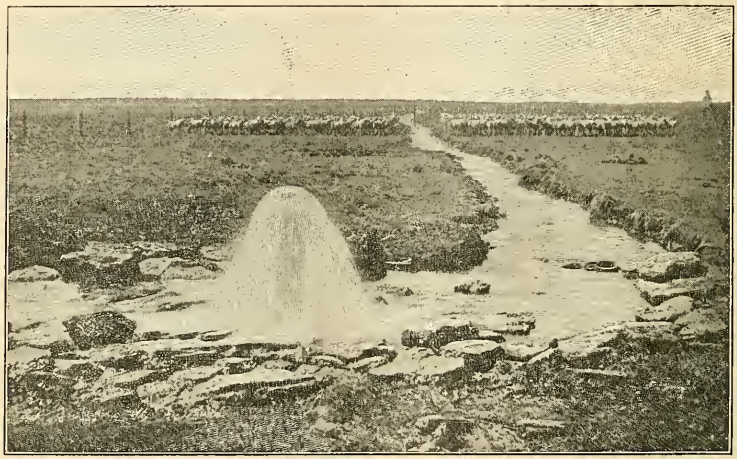


Fig. 546.

A sheep run in Australia. The water in this artesian well rises from a layer of porous rock over six hundred feet below the surface.

are raised in large numbers. While the sheep graze in the arid interior, cattle are more numerous in the districts where there is heavier rain. Many cattle, especially near the coast, are raised for their dairy products, and butter is exported to England. At the season when the cows of Belgium and Denmark are stalled because of the cold, the dairy herds of New South Wales are feeding on fresh pastures. Explain the causes of the difference.

Farming. — Since agriculture secures a larger return from the soil than grazing, sheep have been driven from the damp lowlands and from those portions of the plateaus where the rainfall is suffi-

cient for crops. Even in the interior there is farming where irrigation is found possible. In some cases water is supplied from streams; in others, from artesian wells (Fig. 546). Such wells are possible in a number of places where water exists in layers of porous rock beneath the parched plains. Upon boring to these layers, the water gushes forth for use.

Wheat is the most important crop aside from hay, and enough is raised to place Australia twelfth among lands raising this grain.

The farm products are distributed according to climate. For example, while oats and other hardy grains increase southward to Tasmania — since cold increases in that direction — corn is important only from New South Wales northward. There are large sugar plantations on the warm coast of Queensland; and in western Australia, where there are gold mines in the arid interior, much hay is raised for the animals employed at the mines.

As in our Pacific states, fruits are an important product. They range from tropical varieties on the northern coast to oranges and other warm temperate fruits southward, and finally, in the highlands and in Tasmania, to the orchard and small fruits of the cool temperate lands. In Victoria and South Australia, vineyards for the production of wine are of importance. Some of this fruit raising is carried on by the aid of irrigation, as for instance in the Murray River Valley, where the water is supplied by the melting snows of the mountains. In what months would the snows melt there?

Mining. — The gold of Australia, like that of California, was first obtained from the gravels, and mines were later opened along the veins in the mountain rocks. Unlike the condition in western United States, however, absence of water has prevented hydraulic mining on a large scale. Gold mining is still of great importance, Australia ranking second among gold-producing nations (Fig. 571). New deposits are discovered as the country is explored, the recent development of western Australia being largely due to such discoveries.

Copper mining greatly aided in the early development of South Australia, and rich copper mines are now worked in Tasmania. Silver and tin are other important mineral products. Coal is well distributed and of good quality. The best-developed field is near the coast of New South

Wales, and some coal is exported. Rich iron ores, together with limestone, are found associated with these coal fields, and the mining and working of iron will follow with the growth of the country.

Manufacturing. — Some wool is manufactured into cloth; some leather is tanned and made into shoes; and much flour is made from the wheat. There are sawmills and planing mills; and other forms of simple manufacturing are carried on. But for the most part the raw products of Australia are shipped abroad to be manufactured. Most of these products go to England, and the commonwealth depends upon the mother country for

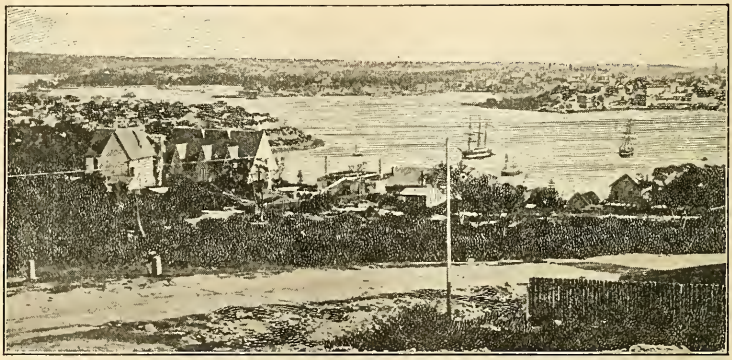


FIG. 547.
Sydney harbor.

most of its manufactured articles. Australia is passing from the pastoral to the agricultural stage of her development, and the stage of extensive manufactures is yet to come.

Cities. — Australian cities have grown very rapidly, and one-third of the people live in the capitals of the six colonies. Favored as the seats of government and as seaports, and connected with the interior by government railways, these capitals have become the leading commercial centres. They are characterized by fine government buildings, and by abundant provision of parks and gardens for the people. Their large suburbs afford homes for the workingmen and save them from the crowded life in tenement houses.

MELBOURNE, the largest city in Australia and the capital of Victoria, is beautifully situated at the head of a broad harbor.

SYDNEY, the capital of New South Wales, founded in 1788, and, therefore, the oldest city of Australia, is noted for its fine harbor (Figs. 547 and 548). At this point the coast faces deep water for a hundred miles; it consists of coves alternating with headlands and is dotted with fine residences set in park-like grounds. Both of these cities rank among the great seaports of the British Empire. ADELAIDE is a third large city. Of which division is it the capital? Name the other capitals.

Since nine-tenths of the Australians live on the coast lands, much of the commerce is carried on by means of steamboats, and most of the cities

FIG. 548.
A view of a part of Sydney.

are seaports connected by rail with the interior farms, mines, and sheep country. A few mining centres, like BALLARAT and BENDIGO in Victoria, have become large towns. Ballarat owes its growth partly to its trade as the centre of a fine farming and grazing country.

ISLAND GROUPS

New Zealand. — More than a thousand miles southeast of Australia are the two large, mountainous islands of New Zealand. In the South Island there are great glaciers among the mountains, while in the North Island there are active volcanoes, and also hot springs and geysers, like those of the Yellowstone National Park.

Since these islands lie in the course of the stormy westerlies, there is heavy rainfall on the western slopes. Therefore the mountains are clothed with forests of pine and other trees, with many kinds of ferns and tree-ferns beneath. On the lee or eastern slopes the rainfall is less, and the land is covered with wiry grasses.

In the south the crops are those of the cool temperate belt; but in the north the climate is mild enough for oranges. Can you suggest how ocean currents may influence the temperature of the north and south? (Fig. 318). What effect must the presence of water on all sides have upon the temperature?

FIG. 549.
A view in New Zealand.

New Zealand is so distant from other lands that few of the larger animals, excepting birds, have ever reached the islands. The native people, or *Maoris*, who must have come to the islands in boats, were a hardy, warlike race, living in protected villages, amidst cultivated fields. Their opposition to newcomers delayed settlement by the English until a half-century after the founding of Sydney. They are now overpowered, and those that survive live mostly in the interior of the North Island. Many have so fully adopted civilized ways that they are allowed representatives in the legislature.

As in Australia, pastoral industries take the lead. There are twenty million sheep, and frozen mutton and wool are exported to England. Cattle are likewise kept, and butter is exported. Agriculture is important, especially in the districts of fertile volcanic

soils on the North Island; but much land that is suited to farming has never been cleared of forest. There are both gold and coal mines among the mountains; and from their slopes are obtained valuable timber and a gum used for varnishes. Manufacturing is only slightly developed, and is chiefly for home use.

Although the industries and life of this English colony resemble those in Australia, its interests are so different that they have prevented its joining the Australian federation — just as the island colony of Newfoundland has declined to join the Dominion of Canada. The situation of these islands in the temperate zone is favorable to rapid progress; and the vigorous immigrants from the British Isles have developed the resources wonderfully, and have established one of the best governments in the world.

FIG. 550.
Houses in the trees in New Guinea.

Many short lines of railway connect the settled interior with the seaports; roads and stage lines extend to the more distant districts; and steamers ply around the coasts and to distant countries. There are four prominent cities of nearly the same size, the smallest of which is WELLINGTON, the capital, and the largest, AUCKLAND, about as large as Duluth in Minnesota.

The East Indies. — Between Asia and Australia are hundreds of islands, some very large, others so small that they find no place on our map. Of these the great majority have animals, plants, and people of Asiatic origin. New Guinea, however, which is nearest to Australia, bears a resemblance not to Asia but to Australia. It is, therefore, usually considered a part of Australasia, while the islands to the west and northwest are classed with Asia.

New Guinea, north of Australia, is one of the largest islands in

the world, having an area equal to Texas and Pennsylvania combined. Although three times the size of New Zealand, it contains a smaller population, composed mainly of savages (Figs. 550 and 551). This difference is due to its position in the torrid zone. The heavy tropical rainfall has clothed most of its surface with dense forests, so that the high mountain ranges and the unhealthful lowlands of the interior are almost unknown.

While the islands farther west are overrun with Malays from Asia, the natives of New Guinea resemble the native Australians. The animal life also resembles that of Australia, indicating that this island, like Aus-

Fig. 551.

A New Guinea village built in the water for protection against enemies.

tralia, has long been separated from Asia. Former connection with Australia is further indicated by the fact that the two are now separated only by a shallow sea.

The three nations that claim New Guinea maintain only trading stations on the coast; and the tropical forests, the fertile soils, and the minerals remain to be utilized in the future.

The East Indies proper also have a tropical climate, and are clothed with dense forests in which the elephant and rhinoceros,

as well as other Asiatic animals, are still found. Most of the natives are Mohammedan Malays from Asia, but some of them are pagans.

The *Philippine Islands*, which belong to the United States, are really a northern extension of the East Indies. What can you tell about them? (p. 188).

Many of the other islands of this region, including Sumatra, Java, the Celebes, and a large part of Borneo and New Guinea, are *Dutch colonies*. What nation controls the island of Timor? To which nation does northern Borneo belong? Borneo, with a greater area than all the New England and Middle Atlantic states together, is one of the largest islands in the world. The immense size of these islands is indicated by the fact that Sumatra is larger than California, while Java has a greater area than New York State.

All of the larger islands are mountainous; in fact, they are parts of mountain ranges rising out of the sea, and among them are many active volcanoes, some of which have had terribly destructive eruptions. There are lowlands near the coasts, and many coral reefs skirting them. Indeed, a large number of the smaller islands are merely coral reefs slightly elevated above the ocean.

Since they are so near the equator, and therefore have a heavy rainfall, these islands have tropical products. The forests supply valuable woods and gums, including gutta-percha and camphor. Large areas, especially in Java, are highly cultivated and produce quantities of rice, sugar cane, and coffee. In the production of the last two articles Java is one of the leading regions of the world (Figs. 579 and 580). Among the noted products of the East Indies are spices, such as pepper, cloves, and nutmegs; in fact, one of the island groups is known as the Spice Islands. What is the other name? There are also valuable minerals, including tin, gold, and precious stones; and from the sea are obtained beautiful pearls and pearl shells.

The Dutch have been remarkably successful in managing their East Indian colonies, which are a source of great wealth; yet the larger islands are so mountainous, and the forests so dense, that great areas are scarcely known. The Dutch East Indies are fifty

times as large as the Netherlands and have seven times as many inhabitants, or nearly half as many as in the United States.

Fig. 552.
A native house in the Friendly (Tonga) Islands.

The largest city among these islands is Manila, in the Philippines; and next in size is Batavia, the centre of the Dutch colonial government.

Islands of the Pacific. — The map (Fig. 539) shows the western Pacific dotted with island groups; but these islands are so small that, although there are many hundreds of them, their combined areas are little more than half that of New Zealand. They are the higher peaks of great mountain folds rising from the ocean floor. Many of them are volcanoes, others submerged peaks upon which corals have grown and formed coral islands.

What names among them have you heard before? To what nations do the groups belong? Although under the control of these foreign nations, the local government is usually administered by native chiefs.

Fig. 553.
A native village in the Fiji Islands.

Together these islands have a population of less than a million; but the natives have been decreasing in numbers, partly because of drunkenness and disease following contact with Europeans. Although missionaries have converted many to Christianity, others remain savages, and some even practise cannibalism. They are the best sailors of all the natural races, and in past centuries reached the islands in boats from Asia, going from group to group.

There is a marked difference between life on the "low," or coral, and that on the "high," or volcanic, islands. Volcanic islands, like Fiji, whose peaks rise several thousand feet, are heavily forested on their rainy, windward slopes; and their fertile soil encourages agriculture. Thus the coffee plantations of New Caledonia and the sugar plantations of Fiji recall the products of the volcanic Hawaiian Islands. As in Hawaii, also, bananas and pineapples are raised for home consumption and for export.

On the low coral islands, on the other hand, the cocoa palm is the mainstay of human life, supplying food, clothing, shelter, boats, many utensils, and the means of trade as well. *Copra*, the main export from Samoa and from many of the Pacific islands, is the dried meat of the cocoanut, of value for its oil and as food. There is, of course, little mineral wealth in the volcanic and coral islands; but in some of the islands, where mountain folds reach the surface, there are mineral deposits, such as the nickel found in New Caledonia. Among the coral reefs beautiful pearls are found.

REVIEW QUESTIONS. — *Australia.* (1) What about its position, area, and population? (2) Where are the mountains? (3) What resemblance is there to North America? (4) How do the streams vary in the several sections? (5) What is the nature of the coast? (6) Tell about the Great Barrier Reef. (7) How does the rainfall vary in the different parts of Australia? Give the reasons. (8) What differences in plant life are thus caused? (9) What is the influence on industries? (10) Mention some of the ways in which the plants are adapted to their surroundings. (11) Tell about the forests. (12) Tell about the natives. (13) Give reasons why Australia was not settled earlier. (14) What finally led to rapid settlement and development? (15) Tell about the government. (16) Tell about sheep raising: the Merino sheep; introduction to Australia; development of the industry; care of the sheep. (17) What are the animal products? (18) Tell about farming: water for irrigation; principal products; variation in crops according to climate. (19) What mineral products are found? (20) What is the condition of manufacturing? (21) Why are the capitals so important? (22) Name and locate the three largest cities; what can you tell about each? (23) What about other towns?

Island Groups. (24) Tell about New Zealand: its surface features; climate; native animals and people; leading industries; development; cities. (25) Tell about New Guinea: size; position; climate; people; animals; resemblance to Australia; resources. (26) What about the animals, plants, and people of the East Indies? (27) To what nations do the islands belong? (28) What about their size? (29) Tell about their physiography, climate, and products. (30) What about the success of the Dutch in the East Indies and the extent of their possessions there? (31) Tell about the small island groups: their names; position; origin; government; people; products.

COMPARISONS. — (1) Australia resembles South Africa in its surface, climate, occupations, and products. State how this is true. (2) Australia also resembles western United States in climate, in occupation and products, and in the order of

development of her resources. Describe these points of resemblance. (3) In what respects does southern South America (Chile and Argentina) resemble Australia? (4) What differences are there in climate due to difference in form of the two land masses? (5) What differences in the present condition of development due to the history and the races of each? (6) What part of Australia has the same latitude, in the southern hemisphere, that southern Florida has in the northern? (7) Which of our states most nearly equals New Zealand in area? (8) What peninsula of Europe resembles New Zealand in shape? How do the two countries compare in area? In population? (9) What advantages over Australia has the United States enjoyed in that it has attracted settlers from so many different nations? (10) What part of South America most resembles the East Indies in climate and products? Make the same comparison for North America.

Suggestions. — (1) If it were within your power, how would you arrange the highlands of Australia so as to secure the most even distribution of rain? (2) Estimate the greatest length of New Zealand. (3) Estimate the distance from Batavia to Manila. (4) Write your impression of the climate of Melbourne in January; in July. (5) Through some fruit dealer obtain a cocoanut in its husk and examine it. (6) Read Whittier's poem on the Palm Tree. (7) Learn something about the work of missionaries in the small Pacific islands. (8) Collect pictures for the school, showing the islands and their life. (9) By what routes can one go from New York City to Australia? Through what waters? Which would be the shortest? About how many miles? (10) Answer the same questions for a voyage from New York to Manila. (11) Read in Tarr's "Elementary Geology" (pp. 251–256) about the origin of atolls. (12) Read about the eruption of Krakatoa (same book, p. 343) in the Sunda Strait, near Batavia.

THE UNITED STATES COMPARED WITH OTHER COUNTRIES

Area and Population. — In spite of the vast extent of the United States, there are three empires in the Old World with a greater

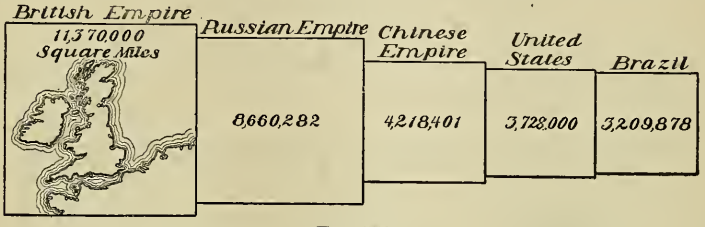


FIG. 554.

Area of the five largest nations.

area. Which are they? (Fig. 554.) Which country is fifth in size? Compare the United States with each of these in area.

The United States also ranks fourth in *population* (Fig. 556). Name the five most populous countries in the order of their rank. What facts do you discover by comparing Figures 554 and 555? Figure 555 shows the *density of population*, or the number of people per square mile, in some of the countries in the world. From this it will be seen that the United States is very thinly settled compared with many countries. Com-

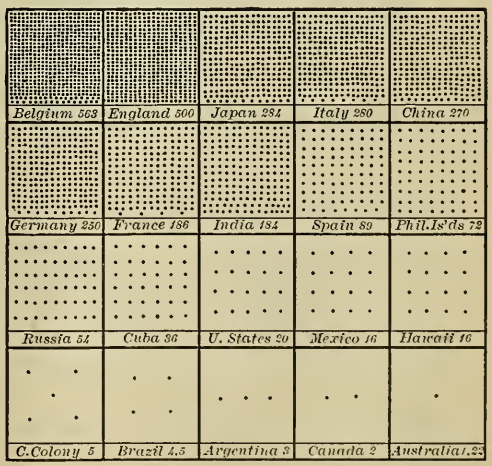


FIG. 555.

Density of population of some of the countries.

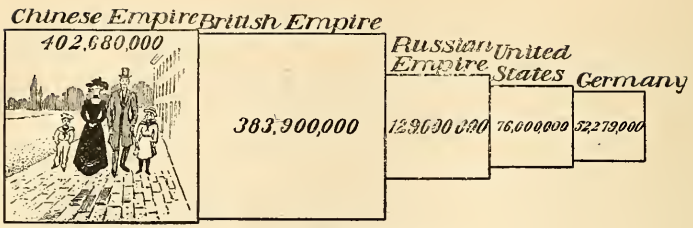


FIG. 556.
The five most populous nations, 1900.

pare the United States in this regard with Belgium, England, Cuba, Mexico, and Canada.

FIG. 557.
Sketch map to show the approximaie distribution of corn.

Leading Raw Products. — Nevertheless, the United States leads the world in many very important respects and approaches leadership in

FIG. 558.
Approximate distribution of wheat.

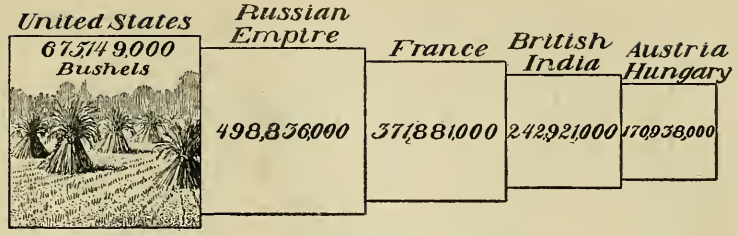


FIG. 559.

The five leading wheat-producing countries, 1898.

several others. Figure 557 shows that no nation is a close rival to us in the production of *corn*. What countries, however, raise large

FIG. 560.

Approximate distribution of cotton.

quantities of it? Why is no corn raised in the British Isles? (p. 352.) *Wheat* is more widely cultivated than corn (Fig. 558). Yet we are far in the lead in that grain (Fig. 559). Point out (Fig. 558) the leading wheat fields of the world. Which sections are important for both wheat and corn? On which side of the Atlantic is wheat raised farthest north? Why?

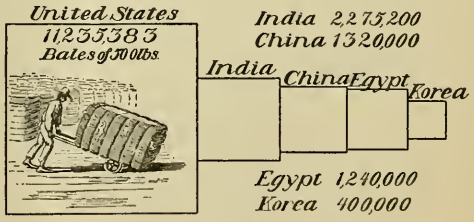


FIG. 561.

The five leading cotton-producing countries, 1898.

Cotton is limited to warm climates (Fig. 560), so that comparatively few countries raise it. Name the five that lead in its production (Fig. 561). To what ex-

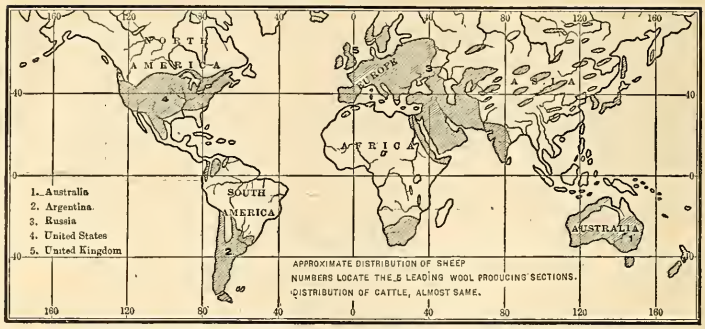


FIG. 562.
Approximate distribution of sheep.

tent does the output of the United States surpass that of the four other countries together? In what parts of the United States is

FIG. 563.
The five leading wool-producing countries, 1899.

most *cotton manufacturing* carried on? What other countries have important cotton-manufacturing industries?

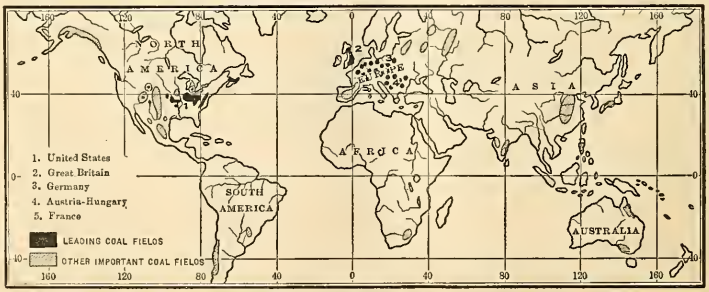


FIG. 564.
Approximate distribution of coal.

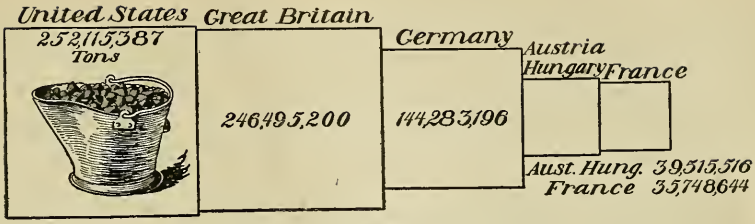


FIG. 565.
The five leading coal-producing countries, 1899.

Note the distribution of *sheep and cattle* (Fig. 562). What is our rank in the production of *wool?* (Fig. 563.) Yet we consume much more than we raise. Recall some facts concerning sheep rais-

FIG. 566.
Approximate distribution of iron mines.

ing in Australia, Argentina, and the United States. What nations have important *woollen manufacturing?*

The extreme importance of *coal and iron for manufacturing* purposes has often been emphasized. But Figure 564 represents the

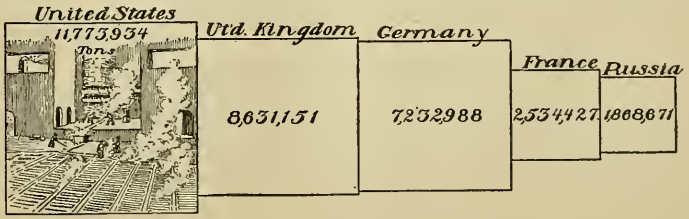


FIG. 567.
The five leading countries in the production of pig iron, 1898.

coal fields as very limited. What countries have little or none? Name the leading coal-producing sections, and state the rank of the United State in this mineral (Fig. 565.)

Is *iron ore* more or less widely distributed than coal? (Fig. 566.) How does the United States rank in the output of this mineral (Fig.

FIG. 568.
Approximate distribution of silver mining.

566); also in the production of *pig iron* (Fig. 567), which demands coal as well as iron ore? How does the output of coal and iron correspond to the importance of countries as manufacturing nations? (Fig. 573.)

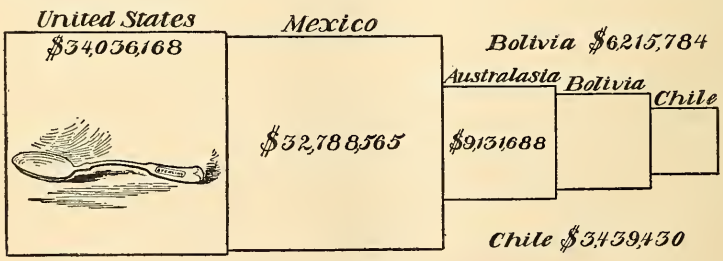


FIG. 569.
The five leading silver-producing countries, 1899.

Where are the principal *silver*-mining sections? (Fig 568.) And how do we compare with other countries in this product? (Fig. 569.) Notice to what extent the world is indebted to the New World for silver. Tell about the distribution of *gold* (Fig. 570) and give our rank in the production of that metal (Fig. 571). How does the

value of the total gold production compare with that of silver in the five leading regions for each ?

The United States leads the world in the production of *petroleum*, or mineral oil, the second most important district being in Russia near the Caspean Sea. Other districts produce little petroleum.

FIG. 570.
Approximate distribution of gold mining.

Manufacturing and Commerce. — According to Figure 572 on what two continents is there the greatest development of *manufacturing?* What other smaller sections are active in this industry? Consider ing the abundance of our raw materials and the energy and intelli-

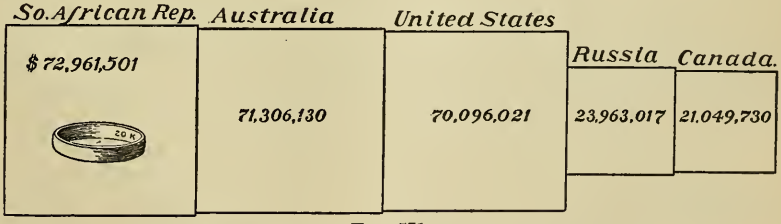


FIG. 571.
The five leading gold-producing countries, 1899.

gence of our people, it is not surprising that we surpass all other countries in such work (Fig. 573). State the rank of other leading nations in this occupation.

In provision for *transportation by rail* the United States also takes the leading place. It has by far the greatest number of miles of

FIG. 572.
Approximate distribution of manufacturing.

railway of any nation (Fig. 574), though several small European countries have a greater development of railways in proportion to their area. The United States ranks second in provision for *trans-*

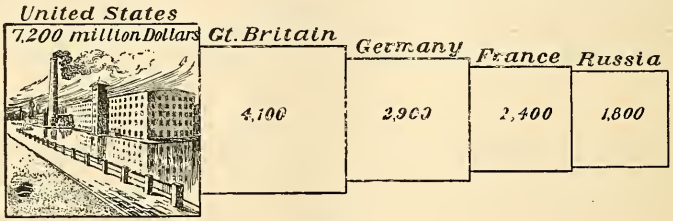


FIG. 573.
The five leading manufacturing countries, 1888.

portation by water (Fig. 575). State the rank of the five chief countries in total length of *railways*, and in *merchant marine*. Give reasons why the United Kingdom should lead in merchant marine (p. 366). Why should Norway be of importance in this respect? (p. 403.)

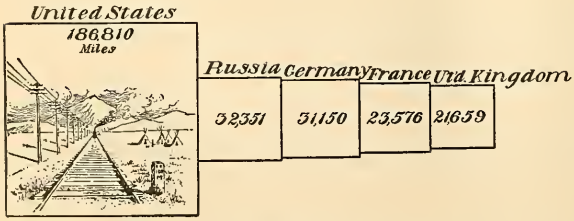


FIG. 574.
The five countries having the greatest length of railways, 1898.

All these facts prepare us for Figure 576, which shows that the United States is the *wealthiest nation* on the face of the earth. Compare our wealth with that of other

leading countries. In how many and what respects have our products and industries been shown to lead all nations of the world?

Dependence upon Other Nations. — Altogether the United States may be considered a wonderfully favored and independent nation, since it has such a wealth of raw products, and such an extensive development of manufacturing. We could, probably, better than any other nation depend upon ourselves alone for all that we need, if occasion should arise. Yet so closely related

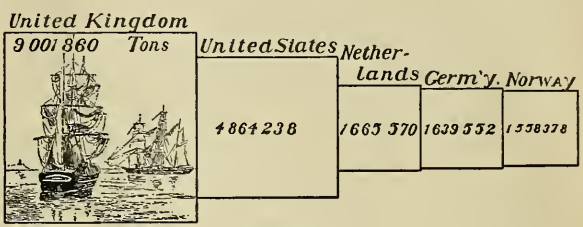


FIG. 575.

The five countries having the largest merchant marine, 1898.

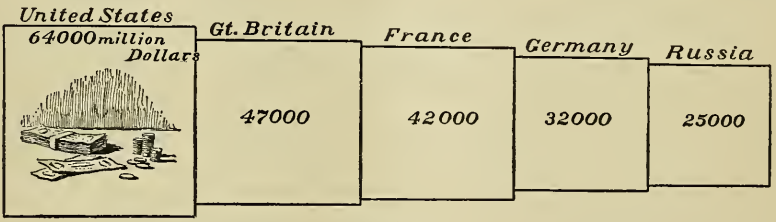


FIG. 576.

The five wealthiest nations, 1888.

are the nations of the world that if war arises between two of them, our industries and markets are affected. This is due largely to the

FIG. 577.

Approximate distribution of coffee.

fact that we produce far more than we need of certain commodities, as wheat, cotton, meat, and iron, for which a market must be found abroad. These we *export*. But it is also due to the fact that we are partly or wholly dependent upon foreign countries for certain other articles. These we *import*.

For example, Figure 577 shows that *coffee* is not grown within our states, although it is daily consumed in almost every household. Notice, however, that it is produced in Cuba, Porto Rico, and the Philippine Islands (Fig. 577). To what climate and countries is it confined? State the rank of the principal coffee-producing sections and compare their output (Fig. 578).

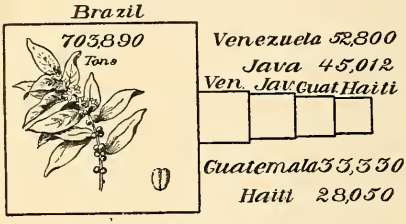


Fig. 578.

The five leading coffee-producing sections, 1899.

Note the *beet sugar* and *cane sugar* areas (Fig. 579). What difference do you detect in the situation of the countries producing these two kinds of sugar? Also note the rank of the leading countries which manufacture cane sugar (Fig. 580). Our own states produce far less sugar each year than we consume. Of what importance, therefore, in this respect is our newly established relation to Cuba and the Hawaiian and Philippine Islands?

We depend wholly on foreign nations for raw *silk*. Name the chief silk-producing countries (Fig 581). What have you learned about the production of silk? Our *tea* also comes almost entirely from abroad, mainly from eastern and southern Asia. From what region mainly? And while much *rice* is produced in our Southern States (Fig. 582), a large amount has to be imported. From what sources must it be obtained? We have, therefore, a very extensive trade in *imports* as well as in *exports*.

Exports and Imports. — Our ten leading exports, named in order of value, together with the principal countries to which the goods are sent, are as follows: —

FIG. 579.

Distribution of sugar-cane and beet sugar.

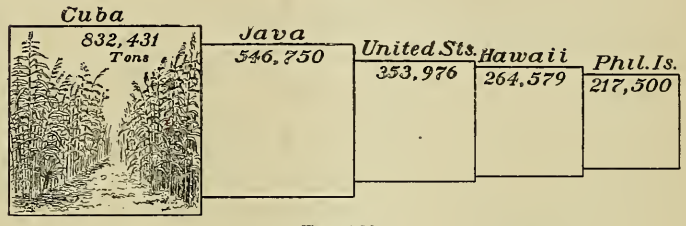


FIG. 580.

The five countries producing most cane sugar, 1898.

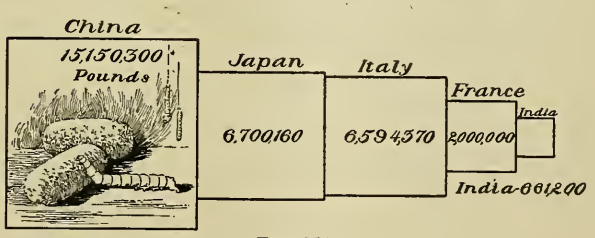


FIG. 581.

The five leading raw silk-producing countries, 1899.

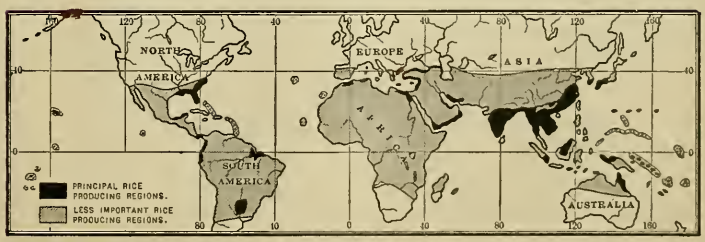


FIG. 582.

Approximate distribution of rice.

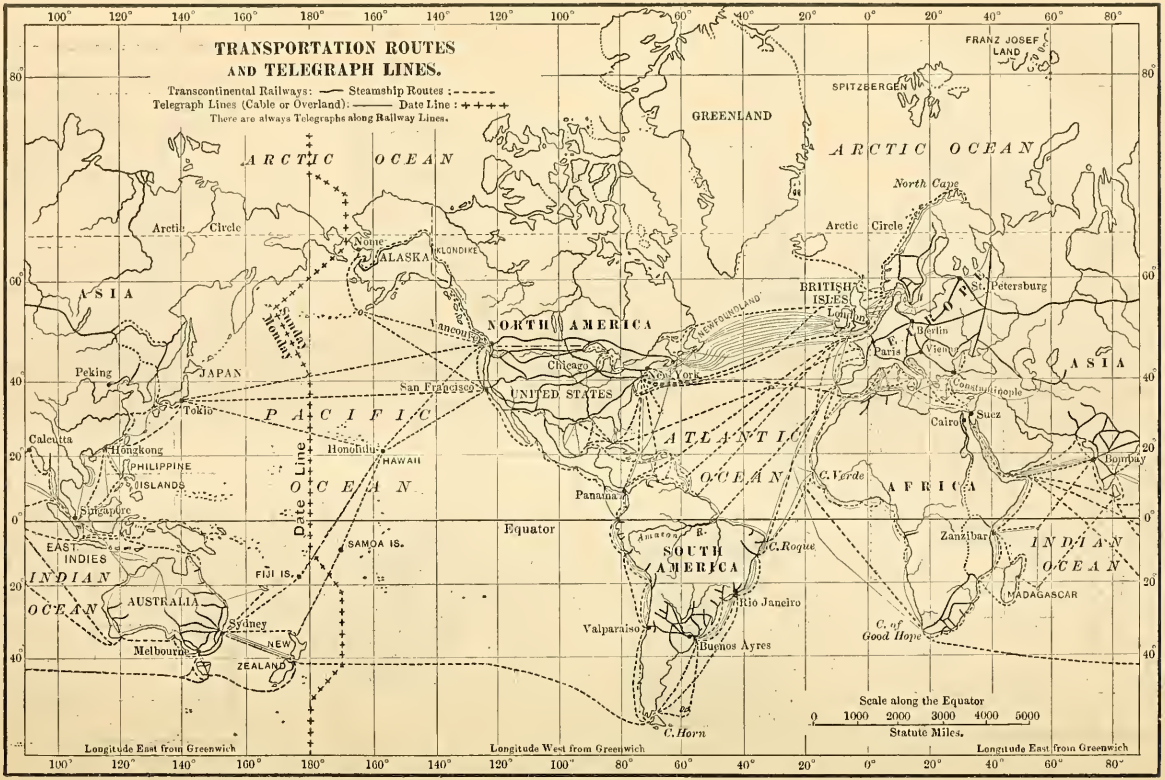

TRANSPORTATION ROUTES
AND TELEGRAPH LINES.
Transcontinental Railways: —— Steamship Routes: - - - - -
Telegraph Lines (Cable or Overland): —— Date Line: + + + +
There are always Telegraphs along Railway Lines.
ARCTIC OCEAN
GREENLAND
FRANZ JOSEF LAND
SPITZBERGEN
North Cape
Arctic Circle
Nome
ALASKA
KLONDIKE
ASIA
NORTH AMERICA
Vancouver
Chicago
New York
San Francisco
UNITED STATES
NEWFOUNDLAND
BRITISH ISLES
London
St. Petersburg
Berlin
Paris
Vienna
Constantinople
Cairo
Suez
Peking
JAPAN
Tokio
PACIFIC OCEAN
Honolulu
HAWAII
Date Line
Calcutta
Hongkong
PHILIPPINE ISLANDS
Singapore
EAST INDIES
INDIAN OCEAN
AUSTRALIA
Sydney
Melbourne
NEW ZEALAND
FIJI IS.
SAMOA IS.
Panama
Equator
ATLANTIC OCEAN
C. Verde
AFRICA
Zanzibar
MADAGASCAR
C. Roque
SOUTH AMERICA
Rio Janeiro
Valparaiso
Buenos Ayres
C. Horn
C. of Good Hope
Bombay
Scale along the Equator
0 1000 2000 3000 4000 5000
Statute Miles.
Longitude East from Greenwich
Longitude West from Greenwich
Longitude East from Greenwich

FIG. 583.

	Articles	Value in 1900	Principal Countries to which they are sent
1.	Cotton (mainly unmanufactured)	$265,836,000	Gt. Britain, Germany, France, Japan.
2.	Breadstuffs (wheat, corn, flour, etc.)	262,744,000	Gt. Britain, Germany, Netherlands, Belgium.
3.	Meat and dairy products	184,453,000	Gt. Britain, Germany, France, Belgium.
4.	Iron and steel, and manufactures of	121,914,000	Gt. Britain, Canada, Germany, Mexico.
5.	Mineral oils	75,612,000	Gt. Britain, Germany, Netherlands, Belgium.
6.	Copper (mainly manufactures of)	57,853,000	Gt. Britain, Netherlands, France, Germany.
7.	Wood, and manufactures of	50,598,000	Gt. Britain, Canada, Germany, W. Indies.
8.	Animals (mainly cattle)	43,585,000	Gt. Britain.
9.	Tobacco	35,433,000	Gt. Britain, Germany, Italy, France.
10.	Leather, and manufactures of	27,293,000	Gt. Britain, Australasia, Canada.
	Total value of exports	$1,394,484,000	

The ten leading imports, on the other hand, are as follows : —

	Articles	Value in 1900	Principal Countries from which they come
1.	Sugar and molasses	$101,141,000	E. Ind., Hawaiian Isds., Cuba, Germany (beet sugar).
2.	Silk, and manufactures of	76,224,000	Japan, France, China, Italy.
3.	Hides and skins	57,936,000	E. Indies, S. America, Gt. Britain, France.
4.	Fibre, and manufactures of	57,933,000	Mexico, Philippines, E. Indies.
5.	Chemicals, drugs, etc.	53,705,000	Germany, E. Indies, Gt. Britain.
6.	Coffee	52,468,000	Brazil, Cent. America, E. Indies, Mexico.
7.	Cotton (mainly manufactures of)	49,502,000	Gt. Britain, Germany, Switzerland, France.
8.	Wool, and manufactures of	36,425,000	Gt. Britain, Germany, France, S. America.
9.	Rubber and rubber goods	33,860,000	Brazil, Gt. Britain.
10.	Fruits and nuts	19,264,000	Italy, Cent. America, W. Indies.
	Total value of imports	$849,941,000	

In Figure 583 trace the main *steamship lines* of the world by which these goods are carried. Compare the value and nature of our exports and imports. How is the result encouraging?

More than one-third of all our foreign trade is with the British Isles, the ten leading countries ranking as follows : —

THE LEADING TEN NATIONS WITH WHICH THE U. S. TRADES

	Countries		Value in 1900	Kinds of Goods
1.	British Isles	Exp.	$533,820,000	Provisions, breadstuffs, raw cotton.
		Imp.	159,582,000	Cotton goods, raw wool, tin, jewelery, rubber goods.
		Total	693,402,000	
2.	Germany	Exp.	187,348,000	Raw cotton, breadstuffs, provisions.
		Imp.	97,375,000	Beet sugar, chemicals and drugs, cotton goods, silk goods.
		Total	284,723,000	

Countries		Value in 1900	Kinds of Goods
3. France	Exp.	83,335,000	Raw cotton, copper, mineral oil.
	Imp,	73,012,000	Silk goods, hides, jewelery, cotton goods.
	Total	156,347,000	
4. Canada	Exp.	97,337,000	Coal, breadstuffs, cotton and manufactures of.
	Imp.	39,932,000	Lumber, coal, hides.
	Total	137,269,000	
5. Netherlands	Exp.	89,387,000	Breadstuffs, provisions, copper, mineral oil.
	Imp.	15,853,000	Jewelery, tin.
	Total	105,240,000	
6. West Indies	Exp.	48,561,000	Provisions, breadstuffs, animals.
	Imp.	52,562,000	Sugar, fruits, cocoa.
	Total	101,123,000	
7. East Indies	Exp.	6,634,000	Mineral oil, cotton goods.
	Imp.	73,243,000	Sugar, hides, tin.
	Total	79,877,000	
8. Brazil	Exp.	11,578,000	Breadstuffs, mineral oil, provisions.
	Imp.	58,073,000	Coffee, rubber, sugar.
	Total	69,651,000	
9. Mexico	Exp.	34,975,000	Coal, cotton goods, iron and steel manufactures.
	Imp.	28,646,000	Sisal grass, coffee, lead, hides.
	Total	63,621,000	
10. Japan	Exp.	29,087,000	Manufactured cotton, mineral oil, iron and steel manufactures.
	Imp.	32,749,000	Silk, tea.
	Total	61,836,000	

Name some of the countries which probably have the same exports as the United States, and which are, therefore, likely to be active rivals to us in supplying foreign markets.

Owing to our trade relations with the United Kingdom, what hardships would probably be brought upon the British if they entered upon a war with us? How might the Germans suffer if they were at war with us? How might the French suffer? On the other hand, what hardships would come to us in each case? Are we more or less independent than these countries in case of war? Why?

Reasons for the Rank of the United States. — The preceding figures and diagrams show that several European countries are the chief competitors with the United States in the *world's trade*. Give examples. But so far as the future is concerned, several important facts are in our favor. In the first place, we are still in our youth as a people, while some of the leading nations of Europe have perhaps already reached the zenith of their power. In the second place, the territory of most of those countries is densely populated, as shown in Figure 555. Note the number of inhabitants per square mile in Belgium, Germany, and France. When we contrast with these figures our average of only twenty persons per square mile,

the possibility of our future growth seems almost without limit. Immense tracts of land, which in Europe would be carefully tilled, are in our country not even cleared for pasture ; and in no large section of the United States do we even approach the careful hand tillage of Belgium and some other European countries.

Another point in our favor is the varied climate and physiography of our vast country, encouraging varied products. Almost all farm products can be easily raised and our wonderful mineral resources are apparently not equalled on any continent. It will therefore be seen that our natural resources, which have made present development possible, promise equally well for the future.

Our people are another element to be considered in reckoning past success and future promise. They have consisted, in large part, of those who had energy and ambition enough to migrate to a new land in the hope of bettering their condition. In their new home the possibilities have been so great that they have been encouraged to work and to improve themselves. As the environment of the desert has given rise to the nomad, and the ease of life in the tropical forest to the degenerate savage, so the environment in the United States has given rise to a race noted for its energy and enterprise. This race has been possible, however, largely by reason of the fact that it comes from a mixture of peoples already gifted. That resources alone will not make an energetic people and a great nation is well illustrated in China, where nature favors, but racial characteristics and customs are opposed to development.

Nor would the statement of reasons for the present position of the United States and her future prospects be complete if left here. There are two other elements of high importance ; namely, education and government. Where people are hampered by ignorance, petty restrictions, and heavy taxes, unnecessarily imposed upon them by their rulers, they have little opportunity for progress. It is those European countries in which there are the best opportunities for education and the greatest freedom, that have made the greatest progress. And no nation in the world pays more attention to education, or guarantees its people a more active part in their entire government, than the United States.

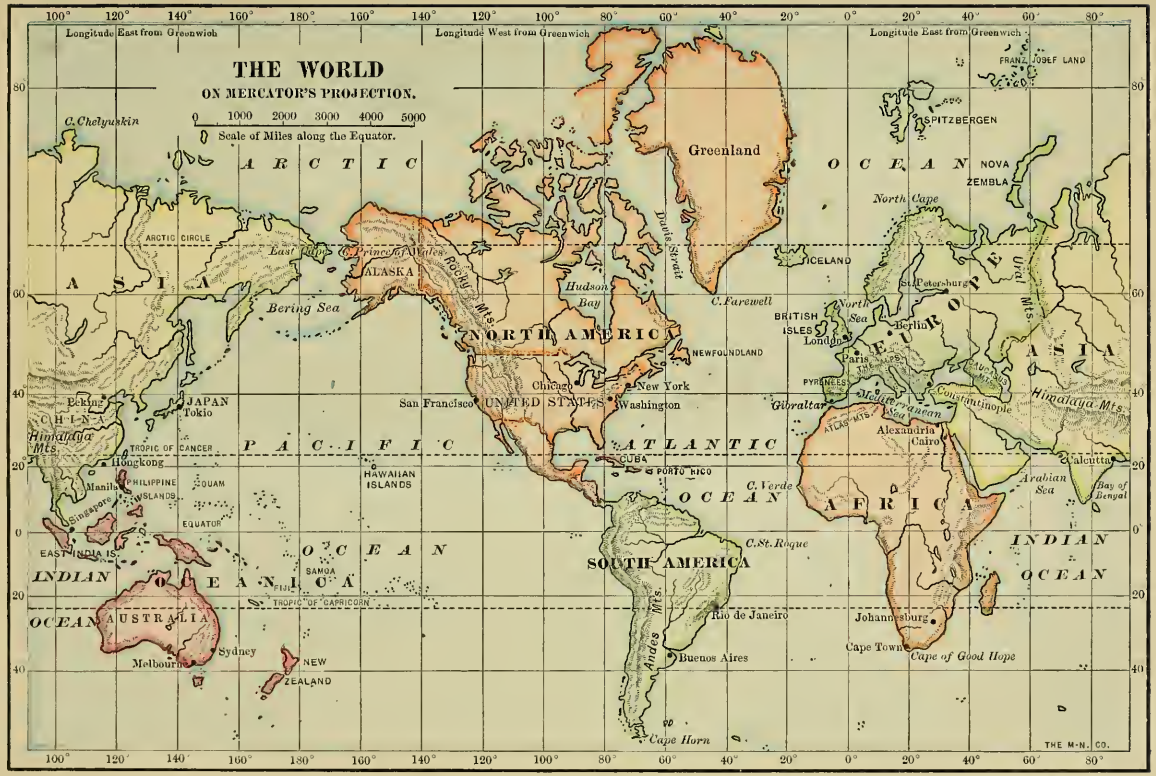

THE WORLD
ON MERCATOR'S PROJECTION.
0 1000 2000 3000 4000 5000
Scale of Miles along the Equator.
Longitude East from Greenwich
Longitude West from Greenwich
Longitude East from Greenwich
C. Chelyuskin
ARCTIC OCEAN
Greenland
FRANZ JOSEF LAND
SPITZBERGEN
NOVA ZEMBLA
North Cape
ARCTIC CIRCLE
East Cape
Prince of Wales
ASIA
ALASKA
Rocky Mts.
Bering Sea
Hudson Bay
Davis Strait
C. Farewell
ICELAND
St. Petersburg
Ural Mts.
EUROPE
North Sea
BRITISH ISLES
London
Berlin
NORTH AMERICA
NEWFOUNDLAND
Paris
ASIA
PYRENEES
Chicago
New York
San Francisco
UNITED STATES
Washington
Gibraltar
Mediterranean Sea
Constantinople
Himalaya Mts.
Peking
JAPAN
Tokio
CHINA
Himalaya Mts.
TROPIC OF CANCER
PACIFIC
ATLANTIC
Alexandria
Cairo
Hongkong
CUBA
PORTO RICO
Calcutta
Manila
PHILIPPINE ISLANDS
GUAM
HAWAIIAN ISLANDS
C. Verde
Arabian Sea
Bay of Bengal
Singapore
EQUATOR
AFRICA
EAST INDIA IS.
C. St. Roque
INDIAN OCEAN
INDIAN OCEAN
SAMOA
FIJI
SOUTH AMERICA
TROPIC OF CAPRICORN
Rio de Janeiro
Johannesburg
AUSTRALIA
Sydney
Melbourne
Andes Mts.
Buenos Aires
Cape Town
Cape of Good Hope
NEW ZEALAND
Cape Horn
THE M·N. CO.

FIG. 435

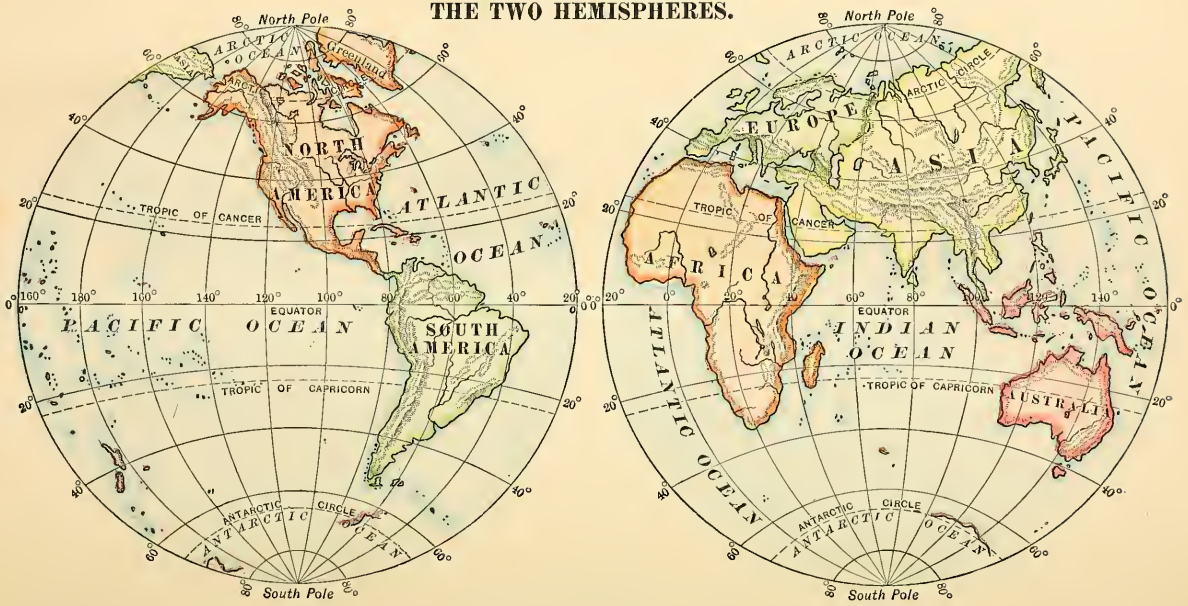

THE TWO HEMISPHERES.
North Pole
ARCTIC OCEAN
Greenland
NORTH AMERICA
ATLANTIC OCEAN
TROPIC OF CANCER
EQUATOR
PACIFIC OCEAN
SOUTH AMERICA
TROPIC OF CAPRICORN
ANTARCTIC CIRCLE
ANTARCTIC OCEAN
South Pole
EUROPE
ASIA
PACIFIC OCEAN
AFRICA
INDIAN OCEAN
AUSTRALIA

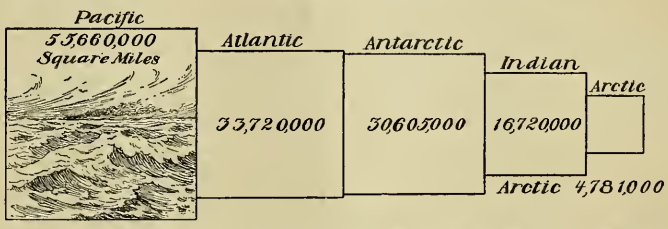
FIG. 434.

APPENDIX

TABLES OF AREA, POPULATION, ETC.

SIZE OF THE EARTH

Length of the Earth's Diameter at the Equator (miles),	7,926	The Earth's Surface (square miles),	196,940,000
Length of Equator (miles),	24,902	Total area of oceans (square miles),	141,486,000



Relative areas of oceans. The Antarctic includes the great southern sea surrounding the south pole.

CONTINENTS AND PRINCIPAL COUNTRIES, COLONIES, ETC.

	Area in Square Miles	Population
North America, '00,	**8,625,594**	**100,000,000**
Alaska, '00	577,390	63,441
Bahama Islands, '91	5,450	47,565
Bermuda Islands, '91	20	15,123
British Honduras, '97	7,562	34,277
Canada, '91	3,315,647	4,829,411
Central America, '97	175,696	3,271,426
Costa Rica, '97	22,996	294,940
Cuba, '99	41,655	1,572,797
Guatemala, '97	49,000	1,535,632
Greenland, '90	500,000	10,516
Haiti (island), '97	28,250	1,380,000
Honduras, '93	46,400	380,000
Jamaica, '97	4,200	706,394
Mexico, '95	767,005	12,636,887
Newfoundland, '92	42,200	203,500
Nicaragua, '95	49,000	360,000
St. Croix, '90	84	19,783
St. John, '90	21	984
St. Thomas, '90	32	12,019
Salvador, '94	8,300	803,534
United States. See p. iii.		
South America, '97	**6,837,000**	**40,000,000**
Argentina, '95	1,778,195	3,954,911
Bolivia, '93	567,430	2,019,549
Brazil, '92	3,209,878	18,000,000
Chile, '95	290,329	2,527,320
Colombia, '81	513,938	3,878,600
Ecuador, '89	120,000	1,271,861
Falkland Isds., '97	6,500	2,050
Galapagos Isds., '89	2,400	200
Guiana, British, '96	109,000	283,315
Guiana, Dutch, '96	46,060	64,372
Guiana, French, '91	46,850	22,710
Juan Fernandez	36	

	Area in Square Miles	Population
Paraguay, '97	98,000	730,000
Peru, '97	449,000	3,000,000
South Georgia Isds.	1,000	uninhabited
Tobago, '97	114	20,785
Trinidad Isd., 97	1,754	254,518
Uruguay, '98	72,110	840,725
Venezuela, '91	593,943	2,323,527
Europe, '97	**3,850,000**	**374,000,000**
Andorra, '97	175	6,000
Austria, '90	115,903	23,895,413
Austria-Hungary, '91	240,942	41,359,204
Balearic Isles, '87	1,860	312,593
Belgium, '97	11,373	6,586,593
British Empire, '98	11,370,000	383,900,000
British Isles, '96	120,979	38,104,975
Bulgaria, '90	38,080	3,310,713
Corsica, '96	3,377	290,168
Crete, '85	3,326	294,190
Denmark, '90	15,289	2,185,335
England, '91	50,867	27,483,490
Faroe Isds., '90	514	12,955
France, '96	204,092	38,517,975
German Empire, '00	208,830	56,345,014
Great Britain, '91	88,094	33,028,172
Greece, '96	25,014	2,433,806
Hebrides Isds., '97	3,000	100,000
Hungary, '90	125,039	17,463,791
Iceland, '97	39,756	70,927
Ireland, '91	32,583	4,704,750
Italy, '98	110,646	31,667,946
Liechtenstein, '91	65	9,434
Luxemburg, '95	998	217,583
Malta, '97	95	177,745
Monaco, '90	8	13,304
Montenegro, '97	3,630	228,000
Netherlands, '97	12,648	5,004,204
Norway, '91	124,445	2,000,917
Orkney Isds., '91	376	30,453
Portugal, '90	36,038	5,049,729
Prussia, '95	134,603	31,855,123
Roumania, '93	48,307	5,800,000
Russia, '97	2,095,616	106,191,795
Russian Empire, '96	8,660,282	129,000,000
San Marino, '96	32	8,500
Sardinia, '98	9,294	766,094
Scotland, '91	29,785	4,025,647
Servia, '95	19,050	2,312,484
Shetland Isds., '91	551	28,711
Sicily, '98	9,936	3,603,310
Spain, '87	197,670	17,565,632
Sweden, '97	172,876	5,009,632
Switzerland, '97	15,976	3,082,989
Turkey, '98	62,744	5,711,000
Turkish Empire, '97	1,576,677	38,790,736
Wales, '91	7,442	1,519,035
Asia, with Islands, '97	**17,255,890**	**831,000,000**
Aden, '91	80	44,079
Afghanistan, '97	215,400	4,000,000
Arabia, '97	845,000	6,000,000
Baluchistan, '97	145,417	500,000
Bhutan, '97	16,800	200,000
Bokhara, '97	92,000	2,500,000
Burma, '91	171,430	7,605,560
Ceylon, '91	25,333	3,009,461
China (proper), '97	1,336,841	386,000,000
Chinese Empire, '97	4,218,401	402,680,000
Chinese Turkestan, '97	431,800	580,000
Cyprus, '91	3,584	209,286
Formosa, '96	13,541	1,996,989
French India, '97	197	286,913
French Indo-China, '97	294,782	16,000,000
India, '91	1,559,603	287,123,350
Japan, '96	161,196	43,705,253
Khiva, '97	22,320	750,000
Korea, '97	82,000	10,500,000
Manchuria, '97	362,310	7,500,000
Mongolia, '97	1,288,000	2,000,000
Nepal, '97	54,000	2–5,000,000
Oman, '97	82,000	1,500,000
Palestine, '97	10,000	400,000
Persia, '97	628,000	9,000,000
Portuguese Indies, '87	1,390	494,836
Russia in Asia, '97	6,564,778	22,697,469
Russian Turkestan, '97	257,134	3,898,106
Siam, '96	300,000	5,000,000
Siberia, '97	4,883,496	5,727,000
Straits Settlements, '91	1,255	512,342
Sungaria, '96	147,950	600,000
Tibet, '97	651,500	6,000,000
Turkey in Asia, '98	650,097	16,823,500
Africa, '97	**11,508,793**	**170,000,060**
Abyssinia, '97	462,000	5,000,000
Algeria (Fr.), '96	184,474	4,430,000
Ashanti (Br.), '91	15,000	1,473,882
British Central and South Africa, '97	500,000	3,000,000
British East Africa	1,000,000	unknown
British Somaliland, '91	68,000	240,000
Canary Isds. (Sp.), '87	2,808	291,625
Cape Colony (Br.), '91	276,925	1,766,040
Cape Verde Isds., '90	1,480	114,130
Egypt, '97	400,000	9,734,405
Egyptian Sudan, '82	950,000	10,000,000
Eritrea (Italy), '93	88,500	450,000
French Sudan, '97	354,000	2,860,000
French Kongo, '97	496,920	8,950,000
French Somaliland, '97	8,640	30,000
French Territory, '97	3,288,034	30,358,890
Gambia (Br.), '97	2,700	50,000
German East Africa, '97	384,000	4,000,000
German Southwest Africa, '97	322,450	202,628
German Territory, '98	930,760	10,200,000
Gold Coast (Br.), '97	46,600	1,473,882
Italian Somaliland, '93	100,000	400,000
Kamerun (Ger.), '98	191,130	3,500,000
Kongo State, '98	900,000	30,000,000
Liberia, '97	14,360	1,068,000

	Area in Square Miles	Population
Madagascar (Fr.), '97	227,750	3,500,000
Madeira Isds., '90	505	134,000
Mauritius (Br.), '91	705	371,655
Morocco, '89	219,000	5,000,000
Natal (Br.), '98	35,000	829,005
Niger Territories (Br.), '99	500,000	20–35,000,000
Orange River Colony, '90	48,326	207,503
Portuguese East Africa, '97	301,000	3,120,000
Portuguese Guinea, '97	4,440	820,000
Portuguese West Africa, '97	490,000	5,000,000
Reunion Island (Fr.), '97	970	171,720
St. Helena (Br.), '91	47	4,116
Sierra Leone (Br.), '97	30,000	250,000
Spanish Africa, '98	243,877	136,000
Togo, '98	33,000	2,500,000
Transvaal Colony, '98	119,139	1,094,156
Tripoli (Turk.), '97	398,900	1,300,000
Tunis (Fr.), '97	50,840	1,500,000
Zanzibar (Br.), '97	640	150,000
Australia, '97	**2,946,691**	**3,036,570**
New South Wales, '98	310,700	1,335,800
Northern Territory, '97	—	4,520
Queensland, '97	668,497	484,700
South Australia, '97	903,690	358,224
Tasmania, '91	26,385	146,667
Victoria, '98	87,884	1,169,434
Western Australia, '97	975,920	161,924
East Indies and Larger Islands of Pacific.		
Borneo, '97	243,843	1,575,000
Celebes, '97	71,470	1,997,860
Fiji Isds., '97	8,045	121,798
Hawaiian Isds., '00	6,640	154,001
Java, '97	50,554	25,697,701
Molucca Isds., '97	43,864	399,208
New Caledonia, '97	7,630	51,000
New Guinea, '97	312,329	800,000
New Zealand, '96	104,471	743,214
Philippine Isds., '97	114,326	7,000,000
Samoa Isds., '97	1,701	34,000
Solomon Isds.	16,300	175,000
Sumatra, '97	161,612	3,209,037

Total Area of Continents **50,423,968**
Total Population **1,519,000,000**

STATES AND TERRITORIES OF THE UNITED STATES

	Area in Square Miles	Population, 1900
Alabama	52,250	1,828,697
Alaska	577,390	63,441
Arizona	113,020	122,931
Arkansas	53,850	1,311,564
California	158,360	1,485,053
Colorado	103,925	539,700
Connecticut	4,990	908,355
Delaware	2,050	184,735
District of Columbia	70	278,718
Florida	58,680	528,542
Georgia	59,475	2,216,331
Guam, '87	180	8,561
Hawaiian Isds.	6,640	154,001
Idaho	84,800	161,772
Illinois	56,650	4,821,550
Indiana	36,350	2,516,462
Indian Territory	31,400	391,960
Iowa	56,025	2,231,853
Kansas	82,080	1,470,495
Kentucky	40,400	2,147,174
Louisiana	48,720	1,381,625
Maine	33,040	694,466
Maryland	12,210	1,190,050
Massachusetts	8,315	2,805,346
Michigan	58,915	2,420,982
Minnesota	83,365	1,751,394
Mississippi	46,810	1,551,270
Missouri	69,415	3,106,665
Montana	146,080	243,329
Nebraska	77,510	1,068,539
Nevada	110,700	42,335
New Hampshire	9,305	411,588
New Jersey	7,815	1,883,669
New Mexico	122,580	195,310
New York	49,170	7,268,012
North Carolina	52,250	1,893,810
North Dakota	70,795	319,146
Ohio	41,060	4,157,545
Oklahoma	39,030	398,245
Oregon	96,030	413,536
Pennsylvania	45,215	6,302,115
Philippine Isds., '97	114,326	7,000,000
Porto Rico, '99	3,550	953,243
Rhode Island	1,250	428,556
South Carolina	30,570	1,340,316
South Dakota	77,650	401,570
Tennessee	42,050	2,020,616
Texas	265,780	3,048,710
Tutuila	55	3,800
Utah	84,970	276,749
Vermont	9,565	343,641
Virginia	42,450	1,854,184
Washington	69,180	518,103
West Virginia	24,780	958,800
Wisconsin	56,040	2,069,042
Wyoming	97,890	92,531
United States, total	**3,728,000**	**84,266,603**
United States (without Alaska, Philippine Isds., etc.)	**3,025,600**	**76,087,350**

TWENTY-FIVE LARGEST CITIES IN THE WORLD

		Population
1.	London, England, '98	4,504,766
	Greater London, '98	6,408,321
2.	New York, U.S., '00	3,437,202
3.	Paris, France, '96	2,536,834
4.	Canton, China, '97	2,500,000
5.	Berlin, Germany, '00	1,884,345
6.	Chicago, U.S., '00	1,698,575
7.	Vienna, Austria-Hungary, '90	1,364,548
8.	Tokio, Japan, '96	1,299,941
9.	Philadelphia, U.S., '00	1,293,697
10.	St. Petersburg, Russia, '97	1,267,023
11.	Moscow, Russia, '97	988,614
12.	Tientsin, China, '97	950,000
13.	Peking, China, '98	900,000
14.	Constantinople, Turkey, '85	873,565
15.	Calcutta, India, '91	861,764
16.	Bombay, India, '91	821,764
17.	Hankau, China, '97	800,000
18.	Buenos Aires, Argentina, '98	753,000
19.	Glasgow, Scotland, '98	724,349
20.	Hamburg, Germany, '00	704,069
21.	Hangchav, China, '97	700,000
22.	Fuchau, China, '97	650,000
23.	Warsaw, Russia, '97	638,209
24.	Liverpool, England, '98	633,645
25.	St. Louis, U.S., '00	575,238

TWENTY-FIVE LARGEST CITIES IN THE UNITED STATES IN 1900

		Population
1.	New York, N.Y.	3,437,202
2.	Chicago, Ill.	1,698,575
3.	Philadelphia, Pa.	1,293,697
4.	St. Louis, Mo.	575,238
5.	Boston, Mass.	560,892
6.	Baltimore, Md.	508,957
7.	Cleveland, Ohio	381,768
8.	Buffalo, N.Y.	352,387
9.	San Francisco, Cal.	342,782
10.	Cincinnati, Ohio	325,902
11.	Pittsburg, Pa.	321,616
12.	New Orleans, La.	287,104
13.	Detroit, Mich.	285,704
14.	Milwaukee, Wis.	285,315
15.	Washington, D.C.	278,718
16.	Newark, N.J.	246,070
17.	Jersey City, N.J.	206,433
18.	Louisville, Ky.	204,731
19.	Minneapolis, Minn.	202,718
20.	Providence, R.I.	175,597
21.	Indianapolis, Ind.	169,164
22.	Kansas City, Mo.	163,752
23.	St. Paul, Minn.	163,065
24.	Rochester, N.Y.	162,608
25.	Denver, Colo.	133,859

GROWTH OF THE FIFTEEN LARGEST CITIES OF THE COUNTRY

	City	1800	1830	1890	1900
1.	New York, N.Y.	60,489 (1)	197,112 (1)	1,515,301 (1)	3,437,202
2.	Chicago, Ill.		4,470 (1840)	1,099,850 (2)	1,698,575
3.	Philadelphia, Pa.	41,220 (2)	80,462 (3)	1,046,964 (3)	1,293,697
4.	St. Louis, Mo.	10,049 (1820)	14,125	451,770 (4)	575,238
5.	Boston, Mass.	24,937 (4)	61,392 (4)	448,477 (5)	560,892
6.	Baltimore, Md.	26,514 (3)	80,620 (2)	434,439 (6)	508,957
7.	Cleveland, Ohio	606 (1820)	1,076	261,353 (9)	381,768
8.	Buffalo, N.Y.	2,095 (1820)	8,668	255,664 (10)	352,387
9.	San Francisco, Cal.			298,997 (7)	342,782
10.	Cincinnati, Ohio	2,540 (1810)	24,831 (7)	296,908 (8)	325,902
11.	Pittsburg, Pa.	1,565	12,568	238,617 (12)	321,616
12.	New Orleans, La.	17,242 (1810)	29,737 (6)	242,039 (11)	287,104
13.	Detroit, Mich.	1,422 (1820)	2,222	205,876 (14)	285,704
14.	Milwaukee, Wis.		1,172 (1840)	204,468 (15)	285,315
15.	Washington, D.C.	3,210	18,826	230,392 (13)	278,718

CITIES OF THE UNITED STATES WITH 25,000 OR MORE INHABITANTS IN 1900; AND A FEW OTHERS, MOSTLY MENTIONED IN THE BOOK

(Cuban cities listed here)

	Population		Population
Akron, Ohio	42,728	Altoona, Pa.	38,973
Albany, N.Y.	94,151	Annapolis, Md.	8,402
Albuquerque, N.M.	6,238	Ann Arbor, Mich.	14,509
Allegheny, Pa.	129,896	Ashland, Wis.	13,074
Allentown, Pa.	35,416	Ashville, N.C.	14,694

	Population
Astoria, Ore.	8,381
Atchison, Kan	15,722
Atlanta, Ga.	89,872
Atlantic City, N.J.	27,838
Auburn, N.Y.	30,345
Auburn, Me.	12,951
Augusta, Ga.	39,441
Augusta, Me.	11,683
Austin, Tex.	22,258
Baltimore, Md.	508,957
Bangor, Me.	21,850
Bar Harbor, Me., '90	2,000
Bath, Me.	10,477
Baton Rogue, La.	11,269
Bay City, Mich.	27,628
Bayonne, N.J.	32,722
Berkeley, Cal.	13,214
Biddeford, Me.	16,145
Billings, Mont.	3,221
Binghampton, N.Y.	39,647
Birmingham, Ala.	38,415
Bismarck, N.D.	3,319
Boise, Idaho	5,957
Boston, Mass.	560,892
Bradford, Pa.	15,029
Bridgeport, Conn	70,996
Brockton, Mass.	40,063
Brunswick, Ga.	9,081
Buffalo, N.Y.	352,387
Burlington, Vt.	18,640
Butte, Mont	30,470
Cambridge, Mass.	91,886
Camden, N.J.	75,935
Canton, Ohio	30,667
Carson City, Nev.	2,100
Cedar Rapids, Iowa	25,656
Charleston, S.C.	55,807
Charleston, W.Va.	11,099
Charlotte, N.C.	18,091
Chattanooga, Tenn	32,490
Chelsea, Mass.	34,072
Chester, Pa.	33,988
Cheyenne, Wyo.	14,087
Chicago, Ill.	1,698,575
Cincinnati, Ohio	325,902
Cleveland, Ohio	381,768
Colorado Springs, Colo	21,085
Columbia, S.C.	21,108
Columbus, Ga.	17,614
Columbus, Ohio	125,560
Concord, N.H.	19,632
Council Bluffs, Iowa	25,802
Covington, Ky	42,938
Cripple Creek, Colo.	10,147
Dallas, Tex.	42,638
Danville, Va.	16,520
Davenport, Iowa	35,254
Dayton, Ohio	85,333
Denver, Colo.	133,859
Des Moines, Iowa	62,139
Detroit, Mich	285,704
Dover, Del.	3,329
Dover, N.H.	13,207
Dubuque, Iowa	36,297
Duluth, Minn.	52,969
Durham, N.C.	6,679
Easton, Pa.	25,238
East St. Louis, Ill.	29,655
Elizabeth, N.J.	52,130
Elmira, N.Y.	35,672
El Paso, Tex	15,906
Erie, Pa.	52,733
Evansville, Ind.	59,007
Fall River, Mass.	104,863
Findlay, Ohio	17,613
Fitchburg, Mass.	31,531
Fort Wayne, Ind	45,115
Fort Worth, Tex.	26,688
Frankfort, Ky.	9,487
Galveston, Tex.	37,789
Gloucester, Mass	26,121
Grand Rapids, Mich.	87,565
Greeley, Colo.	3,028
Greenville, S.C.	11,860
Guthrie, Ok.	10,006
Harrisburg, Pa	50,167
Hartford, Conn.	79,850
Havana, Cuba, '99	235,981
Haverhill, Mass.	37,175
Helena, Mont.	10,770
Hilo, Hawaiian Islands	19,785
Hoboken, N.J.	59,364
Holyoke, Mass.	45,712
Honolulu, Hawaiian Islands	39,306
Hot Springs, Ark.	9,973
Houston, Tex	44,633
Indianapolis, Ind.	169,164
Ishpeming, Mich	13,255
Ithaca, N.Y.	13,136
Jackson, Mich.	25,180
Jackson, Miss.	7,816
Jacksonville, Fla.	28,429
Jamestown, N.Y.	22,892
Jefferson City, Mo.	9,664
Jersey City, N.J.	206,433
Johnstown, Pa.	35,936
Joliet, Ill.	29,353
Joplin, Mo.	26,023
Juneau, Alaska	1,864
Kansas City, Kan.	51,418
Kansas City, Mo.	163,752
Key West, Fla.	17,114
Knoxville, Tenn.	32,637
Lacrosse, Wis.	28,895
Lancaster, Pa.	41,459
Lansing, Mich.	16,485
Laramie, Wyo.	8,207
Lawrence, Mass.	62,559
Leadville, Colo.	12,455
Lewiston, Me.	23,761
Lexington, Ky.	26,369
Lincoln, Neb.	40,169
Little Rock, Ark.	38,307
Lockport, N.Y.	16,581

	Population
Los Angeles, Cal.	102,479
Louisville, Ky.	204,731
Lowell, Mass.	94,969
Lynchburg, Va.	18,891
Lynn, Mass.	68,513
Macon, Ga.	23,272
Madison, Wis.	19,164
Malden, Mass.	33,664
Manchester, N.H.	56,987
Manila, Philippines, '87	154,062
Marquette, Mich.	10,058
Matanzas, Cuba, '99	45,282
McKeesport, Pa.	34,227
Memphis, Tenn.	102,320
Meriden, Conn.	24,296
Milwaukee, Wis.	285,315
Minneapolis, Minn.	202,718
Mobile, Ala.	38,469
Montgomery, Ala.	30,346
Montpelier, Vt.	6,266
Nashua, N.H.	23,898
Nashville, Tenn.	80,865
Natchez, Miss.	12,210
Newark, N.J.	246,070
New Bedford, Mass.	62,442
New Britain, Conn.	25,998
Newcastle, Pa.	28,339
New Haven, Conn.	108,027
New Orleans, La.	287,104
Newport, Ky.	28,301
Newport, R.I.	22,034
Newport News, Va.	19,635
Newton, Mass.	33,587
New York, N.Y.	3,437,202
Niagara Falls, N.Y.	19,457
Nome City, Alaska	12,486
Norfolk, Va.	46,624
Norristown, Pa.	22,265
Oakland, Cal.	66,960
Ogden, Utah	16,313
Oil City, Pa.	13,264
Oklahoma, Ok.	10,037
Olean, N.Y.	9,462
Olympia, Wash.	4,082
Omaha, Neb.	102,555
Oshkosh, Wis.	28,284
Oswego, N.Y.	22,199
Passaic, N.J.	27,777
Paterson, N.J.	105,171
Pawtucket, R.I.	39,231
Pensacola, Fla.	17,747
Peoria, Ill.	56,100
Philadelphia, Pa.	1,293,697
Phœnix, Ariz.	5,544
Pierre, S.D.	2,306
Pittsburg, Pa.	321,616
Pittsfield, Mass.	21,766
Plymouth, Mass.	9,562
Ponce, Porto Rico, '99	27,952
Portland, Me.	50,145
Portland, Ore.	90,426
Portsmouth, N.H.	10,637

	Population
Poughkeepsie, N.Y.	24,029
Providence, R.I.	175,597
Provincetown, Mass, '95	4,555
Pueblo, Colo.	28,157
Quincy, Ill.	36,252
Quincy, Mass.	23,899
Racine, Wis.	29,102
Raleigh, N.C.	13,643
Reading, Pa.	78,961
Richmond, Va.	85,050
Roanoke, Va.	21,445
Rochester, N.Y.	162,608
Rockford, Ill.	31,051
Rome, Ga.	7,291
Rutland, Vt.	11,499
Sacramento, Cal.	29,282
Saginaw, Mich.	42,345
St. Augustine, Fla.	4,272
St. Joseph, Mo.	102,979
St. Louis, Mo.	575,238
St. Paul, Minn.	163,065
Salem, Mass.	35,956
Salem, Ore.	4,258
Salt Lake City, Utah	53,531
San Antonio, Tex.	53,321
San Diego, Cal.	17,700
San Francisco, Cal.	342,782
San Josè, Cal.	21,500
San Juan, Porto Rico, '99	32,048
Santa Fé, N.M.	5,603
Santiago, Cuba, '99	45,478
Sault Ste. Marie, Mich.	10,538
Savannah, Ga.	54,244
Schenectady, N.Y.	31,682
Scranton, Pa.	102,026
Seattle, Wash.	80,671
Shreveport, La.	16,013
Sioux City, Iowa	33,111
Sioux Falls, S.D.	10,266
Sitka, Alaska	1,396
Somerville, Mass.	61,643
South Bend, Ind.	35,999
South Omaha, Neb.	26,001
Spokane, Wash.	36,848
Springfield, Ill.	34,159
Springfield, Mass.	62,059
Springfield, Ohio	38,253
Stockton, Cal.	17,506
Superior, Wis.	31,091
Syracuse, N.Y.	108,374
Tacoma, Wash.	37,714
Tallahassee, Fla.	2,981
Tampa, Fla.	37,714
Taunton, Mass.	31,036
Terre Haute, Ind.	36,673
Toledo, Ohio	131,822
Topeka, Kan.	33,608
Trenton, N.J.	73,307
Troy, N.Y.	60,651
Tucson, Ariz.	7,531

	Population
Utica, N.Y.	56,383
Vicksburg, Miss.	14,834
Virginia City, Nev.	2,695
Waltham, Mass.	23,481
Washington, D.C.	278,718
Waterbury, Conn.	45,859
Watertown, N.Y.	21,696
Wheeling, W.Va.	38,878
Wichita, Kan.	24,671
Wilkes Barre, Pa.	51,721
Williamsport, Pa.	28,757
Wilmington, Del.	76,508
Winona, Minn.	19,714
Woonsocket, R.I.	28,204
Worcester, Mass.	118,421
Yonkers, N.Y.	47,931
York, Pa.	33,708
Youngstown, Ohio	44,885

FOREIGN CITIES MENTIONED IN THE TEXT

	Population
Aachen, Germany, '95	110,551
Abbeokuta, Niger Terr., '97	150,000
Aberdeen, Scotland, '98	140,381
Acapulco, Mexico, '97	5,000
Adelaide, Australia, '97	146,125
Aden, Aden, '91	41,910
Adiz Abeba, Abyssinia, '97	3,000
Alexandria, Egypt, '97	319,766
Algiers, Algeria, '91	82,585
Amsterdam, Netherlands, '97	503,285
Antwerp, Belgium, '97	271,284
Archangel, Russia, '97	17,802
Arequipa, Peru, '97	30,000
Asuncion, Paraguay, '95	45,000
Athens, Greece, '96	111,486
Auckland, New Zealand, '96	31,424
Bagdad, Turkey in Asia, '85	145,000
Bahia, Brazil, '90	174,412
Baku, Russia, '97	112,253
Ballarat, Australia, '97	46,137
Bangkok, Siam, '96	250,000
Barcelona, Spain, '87	272,481
Barmen, Germany, '95	126,992
Basel, Switzerland, '97	89,687
Batavia, Java, '91	104,590
Belfast, Ireland, '91	255,950
Belgrade, Servia, '95	59,115
Benares, India, '91	219,467
Bendigo, Australia, '97	43,075
Berbera, Br. Somaliland, '97	30,000
Bergen, Norway, '91	53,684
Berlin, Germany, '00	1,884,345
Berne, Switzerland, '97	49,030
Bethany, Holy Land, '90	1,105
Bethlehem, Holy Land, '97	5,000
Bilbao, Spain, '87	50,772
Birmingham, England, '98	510,343
Bloemfontein, South Africa, '90	3,379
Bogota, Colombia, '86	120,000
Bologna, Italy, '97	153,206
Bombay, India, '91	821,764
Bordeaux, France, '96	256,906
Bradford, England, '98	233,737
Bremen, Germany, '95	141,894
Breslau, Germany, '00	422,415
Brindisi, Italy, '97	14,000
Brisbane, Australia, '97	25,889
Bristol, England, '98	316,900
Brussels, Belgium, '97	551,011
Bucharest, Roumania, '94	232,000
Budapest, Austria-Hungary, '90	505,763
Buenos Aires, Argentina, '98	753,000
Cadiz, Spain, '87	62,531
Cairo, Egypt, '97	570,062
Calcutta, India, '91	861,764
Calgary, Canada, '91	3,876
Callao, Peru, '90	35,492
Cambridge, England, '91	36,983
Canton, China, '97	2,500,000
Cape Town, Cape Colony, '91	51,251
Caracas, Venezuela, '91	72,429
Cardiff, Wales, '98	177,770
Cartagena, Colombia, '86	20,000
Cartagena, Spain, '87	84,171
Catania, Italy, '97	129,651
Cayenne, French Guiana, '97	12,351
Cettinge, Montenegro, '97	2,920
Charlottetown, Canada, '91	11,374
Chemnitz, Germany, '00	206,584
Chengtu, China, '96	250,000
Christchurch, New Zealand, '96	16,964
Christiania, Norway, '98	200,000
Ciudad Bolivar, Venezuela, '91	11,686
Cologne, Germany, '00	376,085
Colon, Colombia, '97	3,000
Constantinople, Turkey, '85	873,565
Copenhagen, Denmark, '90	312,859
Cordoba, Argentina, '95	47,609
Cordoba, Spain, '87	55,614
Cork, Ireland, '91	75,345
Cuzco, Peru, '89	22,000
Damascus, Turkey in Asia, '85	150,000
Danzig, Germany, '95	125,605
Dawson, Canada, '97	10,000
Delhi, India, '91	192,579
Dover, England, '91	33,418
Dresden, Germany, '95	336,440
Dublin, Ireland, '91	245,001
Dundee, Scotland, '98	164,575
Dunedin, New Zealand, '96	22,815
Durban, Natal, '98	39,245
Edinburgh, Scotland, '98	295,628
Elberfeld, Germany, '95	139,337
Essen, Germany, '95	96,128
Fachan, China, '98	400,000

	Population
Fiume, Austria-Hungary, '90	29,494
Fez, Morocco, '89	140,000
Florence, Italy, '97	209,540
Frankfort, Germany, '00	287,813
Fredericton, Canada, '91	6,502
Freetown, Sierre Leone, '91	30,033
Fuchau, China, '97	650,000
Geneva, Switzerland, '97	85, 5
Genoa, Italy, '97	228,862
Georgetown, British Guiana, '91	53,176
Ghent, Belgium, '97	161,125
Gibraltar, Spanish Pen., '97	26,203
Glasgow, Scotland, '98	724,349
Gothenburg, Sweden, '97	120,552
Grenada, Spain, '87	73,006
Grimsby, England, '91	51,934
Guatemala, Guatemala, '93	72,102
Guayaquil, Ecuador, '98	50,000
Hyderabad, India, '91	415,039
Hague, Netherlands, '97	196,325
Halifax, Canada, '91	38,556
Halle, Germany, '00	156,503
Hamburg, Germany, '00	704,069
Hamilton, Bermuda, '97	1,296
Hamilton, Canada, '91	48,980
Hammerfest, Norway, '91	2,239
Hangchau, China, '97	700,000
Hankau, China, '97	80 ,000
Hanover, Germany, '95	209,535
Havre, France, '96	119,470
Hebron, Holy Land, '97	10,000
Helsingfors, Russia, '96	77,484
Hobart, Tasmania, '91	24,905
Hongkong, China, '99	259,312
Hue, French Ind. China, '97	30,000
Hull, England, '98	229,887
Iquique, Chile, '95	33,031
Irkutsk, Siberia, '96	51,434
Jerusalem, Holy Land, '85	41,000
Johannesburg, Transvaal, '96	102,078
Joppa, Holy Land, '97	23,000
Kabul, Afghanistan, '97	70,000
Khartum, Egyptian Soudan, '98	25,000
Khelat, Baluchistan, '97	14,000
Kiev, Russia, '97	247,432
Kimberley, Cape Colony, '91	28,718
Kingston, Canada, '91	19,264
Kingston, Jamaica, '91	46,542
Kioto, Japan, '96	341,101
Königsburg, Germany, '95	172,758
Krefeld, Germany, '95	107,245
Kumassi, Ashanti, '97	18,000
La Guaira, Venezuela, '97	8,000
La Paz, Bolivia, '93	65,000
La Plata, Argentina, '95	45,410
Lassa, Tibet, '97	25,000
Leeds, England, '98	416,618
Leghorn, Italy, '97	104,536
Leicester, England, '98	208,662
Leipzig, Germany, '00	455,120
Leith, Scotland, '98	76,277
Libreville, French Congo, '97	3,000
Liege, Belgium, '97	167,305

	Population
Lille, France, '96	216,276
Lima, Peru, '91	103,956
Limoges, France, '96	77,703
Lisbon, Portugal, '91	301,206
Liverpool, England, '98	633,645
Loanda, Port. W. Africa, '97	14,000
Lodz, Russia, '97	315,209
London, Canada, '91	31,977
London, England, '91	4,504,766
London, Greater, '98	6,408,321
Lourenço Marquez, Port. E. Af., '97	8,000
Lucerne, Switzerland, '99	23,700
Lucknow, India, '91	273,028
Lyon, France, '96	466,028
Madras, India, '91	452,518
Madrid, Spain, '87	470,283
Magdeburg, Germany, '95	214,424
Malaga, Spain, '87	134,016
Manãos, Brazil, '93	20,000
Manchester, England, '98	539,079
Mandalay, Burma, '91	188,815
Marseille, France, '96	442,239
Maskat, Oman, '97	40,000
Mecca, Turkey, '85	60,000
Melbourne, Australia, '97	458,610
Messina, Italy, '97	152,648
Metz, Germany, '95	59,794
Mexico City, Mexico, '95	344,377
Milan, Italy, '97	470,558
Mocha, Turkey in Asia, '97	5,000
Mombasa, Br. E. Africa, '97	30,000
Monrovia, Liberia, '97	5,000
Montevideo, Uruguay, '97	249,251
Montreal, Canada, '91	216,650
Morocco, Morocco, '97	50,000
Moscow, Russia, '97	988,614
Munich, Germany, '00	498,503
Nagoya, Japan, '96	242,085
Naples, Italy, '97	536,073
Nassau, Bahama, '91	11,000
Nazareth, Holy Land, '97	7,500
Newcastle, England, '98	223,021
Nice, France, '96	93,766
Nijni Novgorod, Russia, '97	95,124
Nottingham, England, '99	239,884
Nuremberg, Germany, '00	260,743
Odessa, Russia, '97	405,041
Oporto, Portugal, '90	138,860
Osaka, Japan, '96	503,690
Ottawa, Canada, '91	44,154
Oxford, England, '91	45,742
Palermo, Italy, '97	287,972
Panama, Colombia, '86	30,000
Para, Brazil, '92	65,000
Paramaribo, Dutch Guiana, '96	30,000
Paris, France, '96	2,536,834
Peking, China, '98	900,000
Pernambuco, Brazil, '90	111,556
Perth, West Australia, '97	37,929
Pietermaritzburg, Natal, '98	24,595
Piraeus, Greece, '96	42,169

	Population
Pisa, Italy, '97	65,516
Port Arthur, Canada, '91	2,698
Port Arthur, Russia in Asia	
Port au Prince, Haiti, '97	60,000
Port Said, Egypt, '97	42,095
Portsmouth, England, '98	186,618
Posen, Germany, '00	116,151
Potsdam, Germany, '95	58,455
Prague, Austria-Hungary, '90	184,109
Pretoria, Transvaal, '96	10,000
Puebla, Mexico, '95	91,917
Quebec, Canada, '91	63,090
Queenstown, Ireland, '91	9,082
Quito, Ecuador, '97	80,000
Rangoon, Burma, '91	180,324
Reims, France, '96	107,963
Riga, Russia, '97	282,943
Rio de Janeiro, Brazil, '90	522,651
Rome, Italy, '97	487,066
Rosario, Argentina, '95	94,025
Rotterdam, Netherlands, '97	298,433
Roubaix, France, '96	124,661
Rouen, France, '96	113,219
St. Etienne, France, '96	136,030
St. John, Canada, '91	39,179
St. John's, Newfoundland, '92	31,142
St. Petersburg, Russia, '97	1,267,023
Samarkand, Russian Turkestan, '97	54,900
San Luis Potosi, Mexico, '95	69,676
San Salvador, Salvador, '94	25,000
Santiago, Chile, '97	302,131
Santo Domingo, Santo Domingo, '92	14,150
Santos, Brazil, '97	15,000
São Páulo, Brazil, '92	100,000
Seoul, Korea, '97	250,000
Seville, Spain, '87	143,182
Sèvres, France, '91	6,902
Shanghai, China, '97	457,000
Sheffield, England, '98	356,478
Siangtan, China, '98	1,000,000
Singanfu, China, '98	600,000
Singapore, Straits Settlements, '91	160,000
Smyrna, Turkey, '85	200,000
Sofia, Bulgaria, '93	46,593
Southampton, England, '91	65,325
Stettin, Germany, '00	209,928
Stockholm, Sweden, '97	288,602
Strassburg, Germany, '95	135,688
Stuttgart, Germany, '95	158,321
Suchau, China, '97	500,000
Sucre, Bolivia, '97	19,000
Suez, Egypt, '82	10,919
Swansea, Wales, '99	103,722
Sydney, Australia, '97	417,250
Tampico, Mexico, '94	9,885
Tananarivo, Madagascar, '97	90,000
Tangier, Morocco, '89	30,000
Tashkend, Russian Turkestan, '97	156,414
Teheran, Persia, '97	210,000
Tiberias, Holy Land, '97	3,000
Tientsin, China, '97	950,000
Tiflis, Russia, '97	160,645
Timbukto, Sudan, '97	20,000
Tokio, Japan, '96	1,299,941
Toronto, Canada, '91	181,220
Trebizond, Turkey in Asia, '97	35,000
Trieste, Austria-Hungary, '90	158,344
Tripoli, Tripoli, '85	30,000
Trondhjem, Norway, '91	29,162
Tunis, Tunis, '96	153,000
Turin, Italy, '97	351,855
Upernivik, Greenland, '70	700
Valencia, Spain, '87	170,763
Valparaiso, Chile, '97	139,038
Vancouver, Canada, '91	13,685
Venice, Italy, '97	155,899
Vera Cruz, Mexico, '95	88,993
Verseilles, France, '96	54,874
Victoria, Canada, '91	16,841
Vienna, Austria-Hungary, '90	1,364,548
Vladivostok, Siberia, '96	48,843
Warsaw, Russia, '97	638,209
Wellington, New Zealand, '96	37,441
West Ham, England, '98	286,654
Windsor, Canada, '91	10,322
Winnipeg, Canada, '95	38,100
Wuchang, China, '98	300,000
Yarmouth, Canada, '91	6,089
Yokoba, Niger Terr., '97	50,000
Yokohama, Japan, '96	179,502
Zanzibar (British), '97	30,000
Zurich, Switzerland, '97	151,994

ELEVATION OF SOME PLATEAUS AND MOUNTAIN PEAKS

	Feet
Abyssinian Plateau	5-7,000
Aconcagua, Andes, Argentina (*highest in South America*)	22,860
Apo, Mindanao, Philippines	10,312
Ararat, Turkey in Asia	17,325
Mt. Blanc, Alps, France (*highest in Alps*)	15,781
Bolivian Plateau	10-13,000
Brazilian Plateau	2-2,500
Chimborazo, Andes, Ecuador	20,498
Cotopaxi, Andes, Ecuador	19,613
Elbruz, Caucasus, Russia	18,200
Etna, Sicily	10,835
Everest, Himalayas, Nepal (*highest known in world*)	29,002
Frémont Peak, Rocky Mts., Wy.	13,790
Fujiyama, Japan	12,365
Hecla, Iceland	5,110
Kenia, Africa	19,000
Kilimanjaro, Africa (*highest known in Africa*)	19,780
Kosciusko, Australia (*highest in Australia*)	7,336

	Feet
Logan, Coast Ranges, Canada (*highest known in Canada*)	19,539
McKinley, Alaska (*highest known in North America*)	20,464
Mauna Kea, Hawaiian Islands	13,805
Mauna Loa, Hawaiian Islands	13,675
Mayon, Luzon Island, Philippines	8,900
Mexican Plateau	5–6,000
Mitchell, Appalachian Mts., N.C. (*highest in Eastern U.S.*)	6,711
Mt. Marcy, N.Y.	5,344
Mt. Tina, Haiti	10,300
Orizaba, Mexico (*highest in Mexico*)	18,314
Pico del Turquino, Cuba	8,600
Pikes Peak, Rocky Mts., Colorado	14,108
Popocatapetl, Mexico	17,798
Rainier, Cascade Mts., Washington	14,526
St. Elias, Alaska	18,100
San Francisco Mountain, Arizona	12,794
Shasta, Cascade Mts., California	14,380
Tibet Plateau	10–15,000
United States, Western Plateau	5–6,000
Vesuvius, Italy	4,200
Washington, White Mts., N.H. (*highest in Northeastern U.S.*)	6,293
Whitney, Sierra Nevada, California (*highest in Western U.S.*)	14,898
Yunque, Porto Rico	3,609

SOME OF THE LARGEST RIVERS OF THE WORLD

	Length in Miles	Basin Area Sq. Miles	Ocean
North America			
Arkansas	2,170	185,671	Atlantic
Colorado	2,000	225,049	Pacific
Columbia	1,400	216,537	Pacific
Mackenzie	2,000	590,000	Arctic
Missouri	3,000	527,155	Atlantic
Missouri-Mississippi	4,300	1,257,000	Atlantic
Nelson	1,732	432,000	Atlantic
Ohio	975	201,720	Atlantic
Rio Grande	1,800	240,000	Atlantic
St. Lawrence	2,200	530,000	Atlantic
Yukon	2,000	440,000	Pacific
South America			
Amazon	3,300	2,500,000	Atlantic
Orinoco	1,350	366,000	Atlantic
Plata	2,580	1,200,000	Atlantic
São Francisco	1,800	200,000	Atlantic
Europe			
Danube	1,770	300,000	Atlantic
Dnieper	1,200	242,000	Atlantic
Dwina	1,000	140,000	Arctic
Elbe	725	55,000	Atlantic
Po	400	27,000	Atlantic
Rhine	800	75,000	Atlantic
Rhone	500	38,000	Atlantic

	Length in miles	Basin Area Sq. Miles	Ocean
Europe			
Seine	482	30,300	Atlantic
Thames	228	6,100	Atlantic
Volga	2,400	563,300	Caspian
Asia			
Amur	2,800	520,000	Pacific
Brahmaputra	1,800	425,000	Indian
Ganges	1,500	440,000	Indian
Hoang-ho	2,700	570,000	Pacific
Indus	1,800	372,700	Indian
Irawadi	1,500	158,000	Indian
Lena	2,800	950,000	Arctic
Mekong	2,800	280,000	Pacific
Ob	3,200	1,000,000	Arctic
Yangtse-kiang	3,200	548,000	Pacific
Yenisei	3,000	1,500,000	Arctic
Africa			
Kongo	2,900	1,200,000	Atlantic
Niger	2,600	563,300	Atlantic
Nile	3,400	1,273,000	Atlantic
Zambesi	1,500	600,000	Indian
Australia			
Darling	1,100	——	Indian
Murray	1,000	270,000	Indian

SOME OF THE LARGE LAKES OF THE WORLD

	Area in Square Miles	Elevation in Feet	Greatest Depth in Feet
Aral Sea	26,900	160	225
Baikal	12,500	1,312	4,550
Balkash	7,800	780	70
Caspian	169,000	−85[1]	2,400
Chad, variable with season	10,000 and often more	800–900	12
Dead Sea	370	−1,310[1]	1,330
Erie	9,990	573	210
Great Bear Lake	11,200	200	—
Great Salt Lake	2,000	4,218	30–50
Great Slave Lake	10,100	—	over 650

[1] *Below* sea level

	Area in Square Miles	Elevation in Feet	Greatest Depth in Feet
Huron	22,322	582	750
Ladoga	7,000	60	730
Manitoba	1,850	810	—
Michigan	21,729	582	870
Nicaragua	3,600	110	83
Nyassa	14,000	1,500	600+
Ontario	7,104	247	738
Superior	30,829	602	1,008
Tanganyika	12,650	2,800	2,100
Titicaca	3,300	12,875	700
Victoria Nyanza	30,000	4,000	590+
Winnipeg	9,400	710	70

DISTRIBUTION OF MANKIND

Mongolians	**540,000,000**
China	380,000,000
Japan and Korea	55,000,000
Indo-China	35,000,000
Malaysia	30,000,000
Other Mongolians	40,000,000
Caucasians	**774,000,000**
Europe	355,000,000
Asia	280,000,000
America	115,000,000
Africa	15,000,000
Australasia	5,000,000
Ethiopians	**173,000,000**
Africa and Madagascar	153,000,000
North and South America	20,000,000
American Indians	**22,172,000**
Mexico	8,765,000
Brazil	4,200,000
Colombia	3,150,000
Peru	2,700,000
Bolivia, Guatemala, and Venezuela	4,225,000
United States	250,000
Canada	100,000

RELIGIONS OF MANKIND

Buddhists and Brahmins	650,000,000
Christians	440,000,000
Jews	8,000,000
Mohammedans	180,000,000
Pagans and others	250,000,000

PRINCIPAL COUNTRIES FROM WHICH THE FOREIGN BORN POPULATION OF THE UNITED STATES HAS COME

Country of Birth	Number in 1890	Country of Birth	Number in 1890
Germany	2,784,894	Scotland	242,231
Ireland	1,871,509	Russia	182,644
Canada and Newfoundland	980,938	Italy	182,580
England	909,092	Poland	147,440
Sweden	478,041	Total of foreign born population	9,249,547
Norway	322,665		

DISTRIBUTION OF NEGROES, IN THE FIFTEEN STATES WHERE THEY ARE MOST NUMEROUS

	States	Number of Negroes in 1890	Percentage of Negroes to total population, 1890
1.	Georgia	858,815	46.74
2.	Mississippi	742,559	57.58
3.	South Carolina	688,934	59.85
4.	Alabama	678,489	44.84
5.	Virginia	635,438	38.37
6.	North Carolina	561,018	34.67
7.	Louisiana	559,193	49.99
8.	Texas	488,171	21.84
9.	Tennessee	430,678	24.37
10.	Arkansas	309,117	27.40
11.	Kentucky	268,607	14.42
12.	Maryland	215,657	20.69
13.	Florida	166,180	42.46
14.	Missouri	150,184	5.61
15.	Pennsylvania	107,596	2.05

Total number of Negroes in 1890, 7,470,040

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